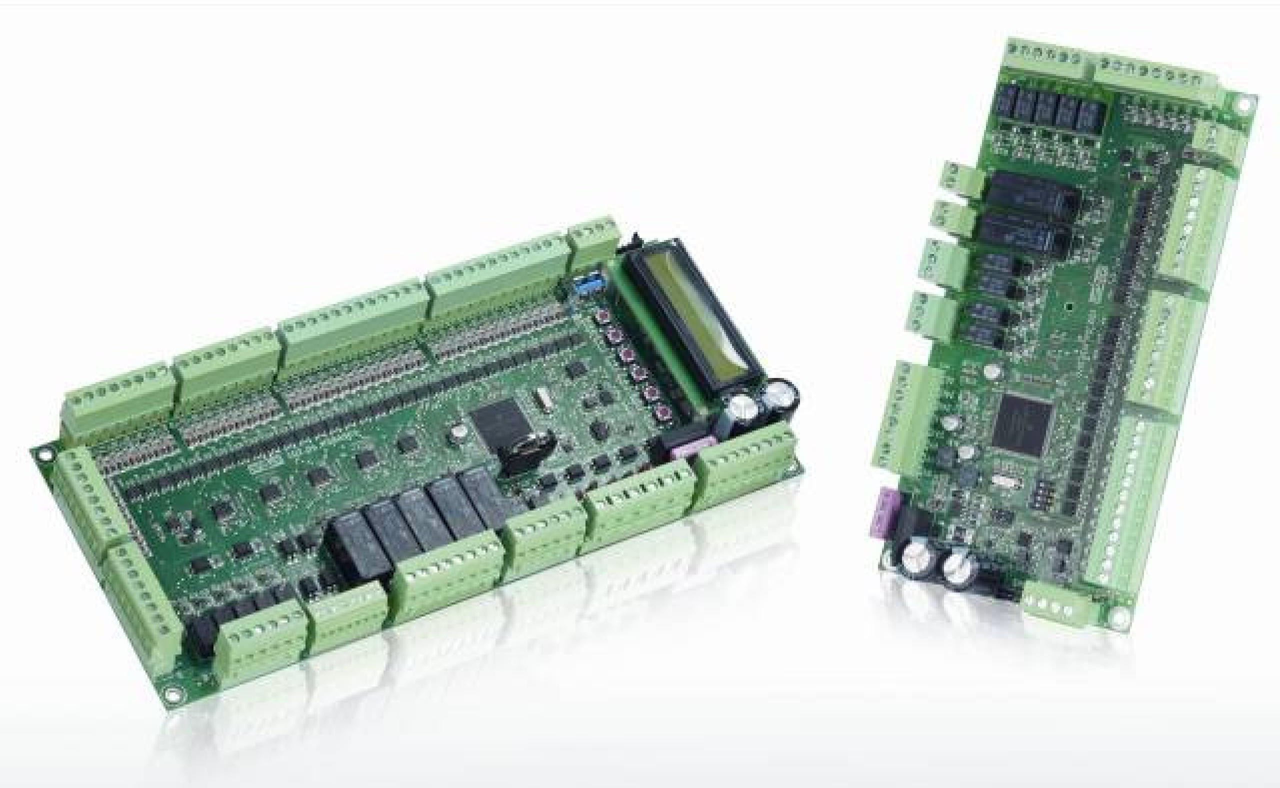
ELESYS

SYSTEM

USER'S MANUAL



00	≥ V01.05	07-06-2015	D. Cavalli
REV.	SOFTWARE	DATE	T.M. Checked and Approved

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DESCRIPTION OF CONNECTIONS – EXAMPLES OF DIAGRAM:

ELEMPU + ELEPLUS BOARDS
(shaft connctions: PARALLEL – car connections: SERIAL)

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1 – INTRODUCTION

ELESYS is a control board system for lift operation, designed and produced by SMS.

ELESYS system is built up by :
- ELEMPU Board
- ELEPLUS Board

ELEMPU board can be used as a STAND-ALONE board in the control panel, with parallel connections only, as for the operation modes shown in the first column on the following Table 1.
For this configuration, refer to this Manual up to Page38 and ANNEX 1 and 2.

ELEPLUS board is connected to ELEMPU board via CAN Bus serial communication, and can be used as a CAR BOARD, or as an expansion to increase the number of stops.
For this configuration, is recommended to read this whole Manual, leaving out Chapters 8 and 9.
The following Table lists all the possible combinations of ELEMPU and ELEPLUS boards, showing the connection mode and the maximum number of stops that the system can handle:

	1	2	3	4
CONTROL PANEL boards	**ELEMPU**	**ELEMPU**	**ELEMPU**	**ELEMPU + ELEPLUS**
CAR boards	**----**	**ELEPLUS**	**2 x ELEPLUS**	**2 x ELEPLUS**
SHAFT connection	PARALLEL	PARALLEL	PARALLEL	PARALLEL
CAR connection	PARALLEL	SERIAL	SERIAL	SERIAL
	MAX NUMBER OF STOPS			
HOME LIFT	8	----	----	----
AUTOMATIC PUSH BUTTON	12	12	----	----
DOWN COLLECTIVE	12	12	24	----
FULL COLLECTIVE	8	12	----	18

Table 1 – ELEMPU – ELEPLUS Configurations

2 – ELESYS SYSTEM GENERAL SPECIFICATIONS

Application Software installed on the micro controller, upgradeable via PC

System configuration and faults diagnostic using 6 buttons and LCD display (16 characters on 2 rows) installed on the board. The parameters are stored permanently in E^2PROM memory, even in absence of the supply voltage.

Operating temperature: 0℃ ÷ 50℃

The ELESYS system manages the following types of installation:

► **DRIVES**

- TRACTION LIFT	- AC 1 speed - AC 2 speeds - VVVF (OPEN/CLOSE loop)
- HYDRAULIC LIFT	- Direct Starting - Soft Starter Starting - HYDROVERT

► **TYPE OF DOORS**

- MANUAL
- SEMIAUTOMATIC
- AUTOMATIC
- PARKING WITH OPEN OR CLOSED DOORS
- 1 / 2 ENTRANCE (2 entrances with ELEPLUS Board only)

► **OPERATIONS**

- AUTOMATIC RESET TO BOTTOM OR TOP FLOOR AT START-UP
- INSPECTION
- MANUAL CONTROL (for testing and adjustments)
- RELEVELING
- AUTOMATIC RETURN TO A SELECTED FLOOR
- EMERGENCY
- V.I.P. CALL
- FIRE-FIGHTERS OPERATION according to EN81-72 & 73

► **CAR POSITION CONTROL SYSTEM**

- MONOSTABLE OR BISTABLE MAGNETIC SWITCHES

► **CONTROLS AND PROTECTIONS**

- MOTOR THERMAL PROTECTION VIA THERMISTORS
- MAXIMUM TRAVEL TIME (separate for HIGH / LOW speed)
- TURNING OFF LIGHT IN THE CAR / FAN TIME DELAY

► **STANDARDS AND DIRECTIVES**

- LIFTS DIRECTIVE	95/16/EC	
- HARMONIZED STANDARDS	EN81-1	EN81-2
- EMC DIRECTIVE	2004/108/EC	
- HARMONIZED STANDARDS	EN12015	EN12016

3 – DESCRIPTION OF THE MAIN OPERATING PHASES

ELEMPU board manages car **POSITION** through 4 magnetic switches:
- 2 switches are used to slow down the car and stop it (USS, DSS)
- 2 switches are used for reset operation and to slow the car at the upper and lower floors (ULS, DLS)

For details see Page 22 and ANNEX 3 and 4.

Also ELESYS manages lift OPERATION in different conditions that can occur during service:

- Automatic service (3.1)
- Reset operation (3.2)
- Inspection operation (3.3)
- Service with manual control (3.4)
- Releveling (3.5)
- Automatic return to a floor (3.6)
- Emergency operation (3.7)
- V.I.P. call (3.8)
- Fire-Fighter operation according to EN81-72 & 73

3.1 - AUTOMATIC SERVICE

This is the regular service of the system.

It completely manages the operating logic of the lift, which can be: Automatic Push Button (A.P.B.), Down Collective or Full Collective.

At starting, the board checks, via the RC input, that none of the contactors involved in car travel has remained "sticked".

The starting sequence is then initiated by activating the closing of any automatic doors. Door closing is allowed only if all reopening devices (photocell, safety edge, door opening button) are not activated.

The board is informed when doors are closed by the closing of the car door contact (safety input SC4); there is no input for the door closing limit switch, which must be connected, if present, in series with the closing contactor coil.

When doors are closed, with a small adjustable delay to allow the complete mechanical closing (see ANNEX 2 – Function F52), the CAM output is enabled to activate any retiring cam; subsequently, after the landing door locked contact closing (safety chain input SC5), the actual starting is commanded and, except for special cases, it always occur at high speed, i.e. with the activation of the outputs Up (AU) or Down (AD), and High Speed (HS) at the same time.

The lift slows down by de-activating High Speed (HS) and activating the Low Speed output (LS).

The stop at floor takes place by opening LS. The opening of AU/AD may be simultaneous with LS (for 2-speeds or hydraulic systems), or it can be appropriately delayed for systems with VVVF drive. The delay can be programmed through an internal timer (see ANNEX 2), or you can use the contact to control contactors present in the VVVF drive, if provided: by connecting this contact (which must close during the travel and open with delay at floor stop) at the TDC input, the opening of the AU/AD relay (and therefore of motor contactors) will be controlled by VVVF.

When motor contactors are switched off, if the car is in the "door zone", i.e. if at least one of the two switches USS and DSS is engaged, the opening of the automatic doors is executed.

The connection of the door open limit switch to the board is optional:

- if the connection is not provided but the limit switch is present, you have to connect it in series with the opening contactor coil. The door opening command from the board will turn off after the time set by the Function F22 (see ANNEX 2), so so it is important that this time is quite close to the actual time of opening, with a margin of at least one second.
- if the limit switch is connected to the board (see Chapters 8 and 14 for the terminal assigned), the door opening command turns off when the limit switch opens; the time set in F22 is a protection time and it works only in case of missing opening of the contact, so it can be set to an higher time, for example to allow the “tuning” procedure of the door regulator at switching on.

3.2 - RESET OPERATION

The reset operation is carried out automatically by bringing the car to an end floor every time the supply voltage is restored or when returning to normal operation, after inspection operation or after some alarm has tripped (such as the maximum travel time or motor protection with thermistors, etc.).

During reset, the position of the car is not defined, therefore at this stage on display appears the message "Floor: --".

Reset is carried out in different ways, depending on the position of the car and the type of drive provided:

- Car outside the slowdown area to bottom floor: it starts in down direction at high speed and stops when the switch DLS opens (1 speed lift) or slows down when DLS opens and stops with the opening of USS and DSS (for all the other types of drives).
- Car approaching the bottom floor area but not at floor level:
  - 1 or 2 speed lift systems: it starts moving up at high speed and stops when switch ULS opens (1-speed lift) or slows down when ULS opens and stops with the opening of USS and DSS (2 speed lift).
  - Hydraulic system or with VVVF drive: it starts moving down at low speed and stops at bottom floor when switches USS and DSS open.

When the car stops at the end floor and opens the doors, the car position is set in correspondence with the end floor reached.

The position of the car is reset even during the normal service, every time the car reaches an end floor, where it is always forced to slow down.

3.3 - INSPECTION OPERATION

During the inspection operation, the maintenance worker on car roof controls its movement in "dead man" mode (with permanent pressure of the push-buttons).

The board detects the status of the inspection switch via the input ISQ (ELEMPU) or ISC(ELEPLUS) (ISQ/ISC = 0 → inspection service active) and controls the movement when the relative inspection push-buttons are activated.

Inspection run can be programmed at high or low speed, if the high speed is set and the motor drive is by VVVF, it is always commanded a medium speed level anyway.

Returning to normal service, a reset operation is performed, with a consequent updating of the car position.

3.4 - MANUAL CONTROL SERVICE

In the manual control service, the maintenance worker can control the movement of the car from the control panel, while normal calls and the opening of the doors are disabled.

The service is activated through the keys on the board, by selecting on the display the menu 2) MANUAL MODE (see Chapter 4 for accessing mode), with the car stopped at floor level.

If the safety chain is closed, the keys 🡅 and 🡇 control (up and down respectively) the starting of the car, which moves at high speed as long as the button is pressed.

When the button is released, the car keeps on moving at high speed until it reaches the first slowdown zone, where slows down and stops at the corresponding floor.

If the button opposite to the direction of travel of the car is pressed (e.g. key 🡇 with car moving up), the lift stops immediately.

To return to automatic operation, you must press the ESC key.

3.5 - RELEVELING

It is the operation that allows the cabin to return within the stop zone, both in up and down direction.

In the control panel shall be provided a SAFETY CIRCUIT (CS) that allows bypassing door contacts when the car is located within the release area of the doors, to enable the releveling operation with the doors open.

The two inputs of the SAFETY CIRCUIT can be controlled by 2 additional switches operating in the door zone, or by a single additional switch (IZS) as shown in the figure, and two relay contacts operated by USS and DSS in parallel (see diagram example at Chapter 9.2).

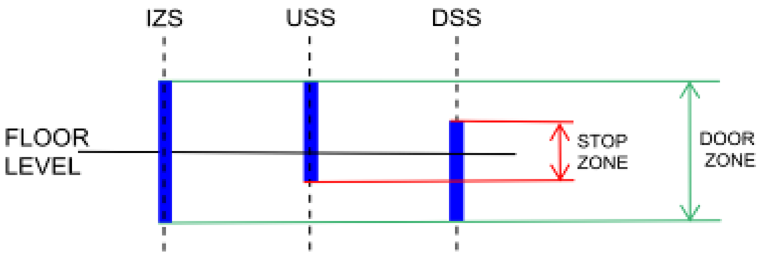


Fig. 1

The board controls the releveling:

- if the car is stationary at least for 3 seconds;
- if the car is located within the stop zone;
- if REL input, which is connected to an auxiliary contact of the safety circuit CS, is active;
- if the car drops below USS, keeping the DSS engaged, the UP command is activated;
- if the cabin rises above DSS, keeping the USS engaged, the DOWN command is activated;

The movement is controlled at low speed if the drive is 2 SPEEDS or HYDRAULIC (without VVVF); while if the drive is with VVVF, a different level of speed (High&Low Speed), that can be programmed on the VVVF itself, is commanded.

Upon the activation of the control of direction and speed, output LEV is also activated; the latter should control an external relay, with NO contact connected in series with the contact of the SAFETY CIRCUIT CS that provides for the by-pass of the contacts of the doors – refer to the description of the SAFETY CHAIN inputs at page 22 or 46 and see example in the diagram in Figure 2.

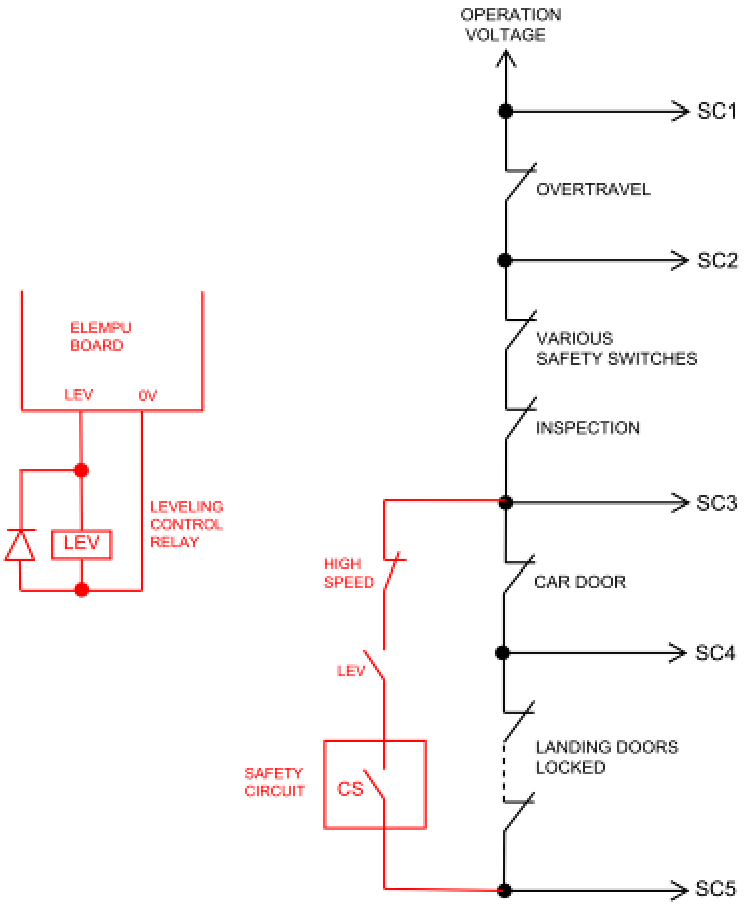


Fig. 2

The releveling operation is disabled in INSPECTION and EMERGENCY mode of operation and also when the safety input SC3 is open, but it remains active during out of service because of the memorized opening of the OVERTRAVEL switch (safety input SC2), on the condition that the overtravel switch has closed in the meantime.

3.6 - AUTOMATIC RETURN TO A FLOOR

The car return to a floor is controlled when the car has no command active, after a preset time (maximum 15 minutes); such control is different for TRACTION lifts (1 speed, 2 speed or VVVF), or HYDRAULIC.

For HYDRAULIC systems, car return is ALWAYS executed and the return floor is the BOTTOM FLOOR.

In the case of TRACTION lifts, this mode of operation has to be programmed if wanted and also the user should select the return floor.

The return is activated automatically only during normal operation; if during return a call is recorded, the return condition is cancelled, and the call is served, stopping, if needed, at the first floor reached, and reversing the direction of travel.

When the car stops to the return floor, the doors do not open.

3.7 - EMERGENCY OPERATION

The emergency operation for bringing the car to the floor in the absence of mains voltage, is activated by the closing of the “emergency” input (ROP) and the operation differs in the case of TRACTION lift (1 speed, 2 speed, or VVVF), or HYDRAULIC

a) **Hydraulic lifts:** After 5 seconds from ROP activation, the car moves down to the lowest floor. When reaching the floor automatic doors, if provided, open and after the full opening of the doors any other operation is prevented until the input ROP returns to OFF state; subsequently, the lift returns to service by performing a reset operation.

b) **Traction lifts:** After 5 seconds from the activation of ROP, the board commands the car to go down: it is not possible to know the direction in which the car will move because it depends on the load, but the speed will certainly be reduced because it is controlled by an emergency inverter.
The lift stops, without slowing down, in the first stop zone reached by the car (i.e., when USS and DSS are both active), the automatic doors open and after doors opening any other operation is prevented until the input ROP returns to OFF state; subsequently, the lift returns to service by performing a reset operation.

3.8 - V.I.P. CALL

The V.I.P. call floor is provided with a key switch (VIC input).
When the key is inserted (VIC = ON), all commands and the existing calls are cancelled, and it is no longer possible to enable other commands.

The car reaches as fast as possible the preset V.I.P. call floor, namely:

a) if the car is stopped, it immediately moves to the V.I.P. call floor.

b) if the car is moving in the same direction as that required by V.I.P. call, it keeps on moving until reaching the V.I.P. call floor.

c) if the car is running in the opposite direction to that requested by V.I.P. call, it slows down and stops at the first floor reached, without opening the doors and, after 2 seconds, it starts moving in the opposite direction to serve the V.I.P. call.

When the car reaches the floor, if the VIC input stays ON, the car calls can be used on one at a time basis: in this way, the “preferential” user can reach the desired floors without the lift being called by another person.

During this operation, the doors park open.

The normal operation of the lift is restored when the key is removed and the VIC input turns OFF.

3.9 - FIRE-FIGHTER OPERATION ACCORDING TO EN81-72 & 73

The fire-fighter operation is possible in 2 ways:

1) Behavior in case of fire (EN81-73), whose requirements apply to all lift systems.
2) Fire prevention lift operation by fire-fighters (EN81-72)

It is provided a programmable function (F44), to define the fire-fighter operation mode:

- If it is set to “NONE”, the activation input of the fire-fighter operation is ignored
- If it is set to “EN81-73”, the fire-fighter operation according to EN81-73 is enabled
- If it is set to “EN81-72”, the fire-fighter operation according to EN81-72 is enabled

Both operations provide a first phase, indicated in the Standards as PHASE1, in which the activation of the operation brings the car to a programmable floor, with subsequent opening of the doors.
In particular:

a) if the car is still, it immediately leaves towards the fire-fighter floor.

b) if the car is running in the direction compliant to the one requested by the fire-fighter operation, it continues the run until it reaches the fire-fighter floor.

c) if the car is running in a direction that is not compliant to the one requested by the fire-fighter operation, it slows down and stops at the first floor it encounters, it does not open the doors, and it leaves again in the opposite direction towards the fire-fighter floor.

If the lift is built-up in compliance to EN81-72 Standards, there is a second phase, called PHASE2, in which the fire-fighters may move the car under their own exclusive control.
For more detailed information, we suggest to read the referential Standards.

For FIRE-FIGHTER OPERATION management the following inputs are involved:

On ELEMPU Board:

- FIRE-FIGHTER OPERATION ACTIVATION CONTACT (FO)

  It can be a key switch at the fire-fighter floor, or the contact of an automatic fire detection system. The status of the input must be ON with firefighter operation. NOT ACTIVE (N.C. contact). When the inputs goes OFF, the fire-fighter operation is activated, bringing the car at the floor defined by Function F45 FIRE-FIGHTERS FLOOR 1.

- KEY SWITCH EXTERNAL TO THE CAR (EKF)

  For activation of PHASE2 of fire-fighter operation, type EN81-72, to allow firefighters to move the car towards a designated floor.

  As defined in point 5.8.8 g) of the Standards, if the key is removed when the car is at a different floor than the designated one, it closes the doors and goes to the designated floor.

  The status of the input must be OFF with PHASE 2 not active (N.O. contact).

- ADDITIONAL EXTERNAL CONTROL (VIC)

  Used to bring the car to the designated fire-fighter floor, with lift compliant to EN81-72, after the designated floor has first been reached, then left for an operation controlled by a fire-fighter in the car.

  This option is described at point 5.8.2 of the Standards.

  The status of the input must be OFF with non active operation (N.O. contact).

On the ELEPLUS Board:

- KEY SWITCH IN THE CAR (IKF)

  For activation of PHASE2 of fire-fighter operation type EN81-72, to allow firefighters to move the car towards a designated floor.

  As defined in points 5.8.8 g - and h) of the Standards, it has priority compared to the external switch, and if the key is removed when the car is at a different floor than the designated one, it closes the doors and remains still.

  The status of the input must be OFF with PHASE 2 not active (N.O. contact).

- KEY SWITCH AT FLOOR (IPA)

  Used as request for FIRE-FIGHTER OPERATION, with arrival of the car at the floor defined by Function F46 FIRE-FIGHTERS FLOOR 2.

  The status of the input must be ON with firefighter operation. NOT ACTIVE (N.C. contact).

Moreover:

- The DOOR OPENING PUSH BUTTON (ODB)

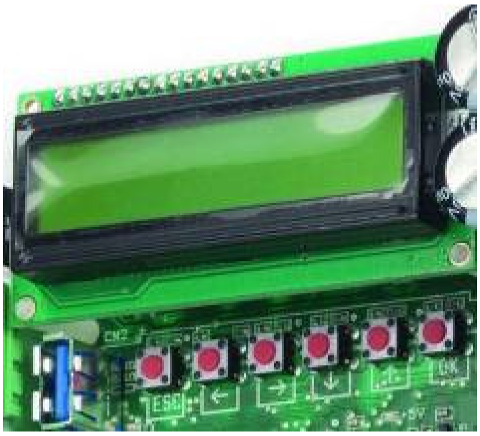
  Operates in PHASE1 and in PHASE 2 of the EN81-72 operation for opening of the car doors, as indicated in points 5.8.7 b - and 5.8.8 e) of the Standards.

  Also it can be activated at the end of PHASE1 of the EN81-73 operation as door opening push button, in the countries where car parking with doors open is not permitted, as indicated in point 5.3.5 of the Standards. In fact, by programming Function F47 ‘DOOR CLOSING PHASE 1’ to 'YES' (see ANNEX 2), after 20 seconds from arrival of the car to the designated floor, the doors close automatically and may be re-opened by pressing the ODB push button.

  If the operation is type EN81-72 or if the F47 value is set on 'NO', this function is not active and at the end of PHASE 1 the doors remain open.
  The status of the input must be ON in case of non activated push button, as for the normal operation (N.C. contact).

In case of return of the activation inputs to normal conditions, the system can return to normal operation only if it has been brought back to the firefighter floor from which the operation started (Point 5.8.8 m of the Standards).

4 – DIAGNOSTICS AND PROGRAMMING



On the ELEMPU board is installed **an LCD DISPLAY** (16 characters on 2 rows) and **6 KEYS** (**ESC, ←,→,↓,↑, OK**).

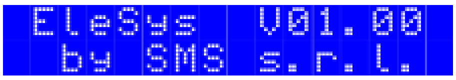
During the operation, the display shows a "STATUS PAGE", which shows the operating status of the system.

In the STATUS PAGE is always displayed:

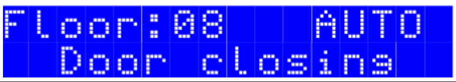
- The FLOOR where the car is:
  The number of the floor displayed depends on the main floor setting: this is always displyed as 00, the upper floors from 01 up, while the lower floors as -1, -2, etc.
  It is indicated with ' -- ' during reset.
- The STATE of the lift, for example:
  - Normal Operation (AUTO)
  - Manual Service Control (MAN)
  - Reset (RES)
  - Inspection (INS)
  - Emergency (EME), etc.
- The SUBSTATE, namely the current operation of the lift such as:
  - Direction and Speed Level
  - Door Opening (Closing)
  - Door Open (Closed)
  - Releveling, etc.

Examples of status pages

On



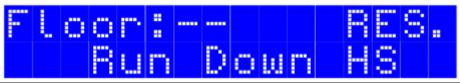
Doors closing



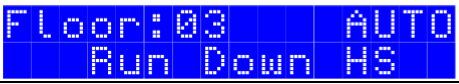
Doors open



Rephasing



Direction and Speed Level



Inspection



Key Functions

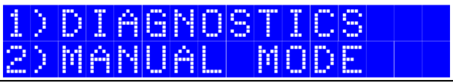
KEY	FUNCTION
OK	Enters the Programming / Diagnostics mode or Confirm the value of the newly modified function.
↑	Go to the next function or increase the value of the selected function.
↓	Go to the previous function, or decrease the value of the selected function.
←	Cancel a change before you press ENTER, or Move the cursor to the left to the desired digit, for changing it.
→	Start changing a function or Move the cursor to the desired digit for changing it.
ESC	Exit the Programming / Diagnostics mode.

Press the OK button with the lift stopped to go to **MENU** page selected, if they are no active priority operations such as inspection, emergency, out of service.

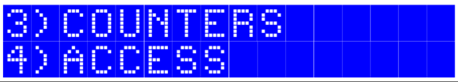
<u>Selection Menu</u>

The selection menu shows a numeric index and a description of the corresponding option.

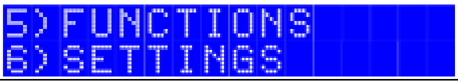
Menu, options 1 and 2



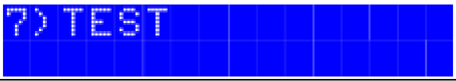
Menu, options 3 and 4



Menu, options 5 and 6



Menu, option 7



By scrolling through the menu using the keys 🡻 and 🡹, the index will flash, with the **OK** button you can select the desired option.

When accessing the menus

3) COUNTERS - 4) ACCESS – 5) FUNCTIONS - 6) SETTINGS - 7) TEST

on the display appears the message "**A 01: Access Code 1**" and on the bottom row is proposed the 8-digit code flashing "**00000000**".

To proceed, you must enter the correct numeric access code, consisting of 8 decimal digits, each one can assume a value from 0 to 9 .

SMS supplies the ELEMPU boards programmed with **Access Code = 00000000**. The user can choose to modify it as needed after the first access (See 4.4 - ACCESS).

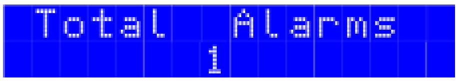
To enter the code, use keys 🡸,🡺,🡻,🡹 as described in the preceding Table "Key Functions".

If the code is not correct, after you have confirmed with **OK**, the value entered keeps on flashing on display until the correct code is entered. To return to normal operation, press **ESC**.

If the code is correct, it is possible to access the MENU.

4.1 - DIAGNOSTICS

By accessing this mode, on display is shown the total number of stored alarms:



If there are one or more alarms, press **OK** to display the numeric code of the first alarm (E--), followed by a brief description,



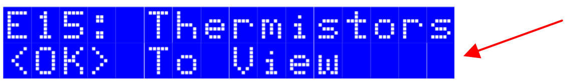
while in the bottom row of the display is shown the number of times that the alarm has tripped:

Pressing 🡹 again you go to the next alarm.
If there is no other alarm, the first alarm will be displayed.

By pressing the keys 🡸 and 🡺 simultaneously, you will clear all the present alarms.

To exit the DIAGNOSTICS mode, press **ESC**.

If an alarm occurs, causing the lift to go OUT OF SERVICE, the display automatically shows the <u>alarm code</u>, that <u>flashes</u> until normal operation is restored:



Press **OK** on this page and then both keys 🡸 and 🡺 to clear the alarm and restore the operation of the lift system.

The various alarm codes are summarized in **ANNEX 1 – ALARM CODES**.

4.2 - MANUAL MODE

Provides access to the MANUAL CONTROL SERVICE, see Chap.3.4 .

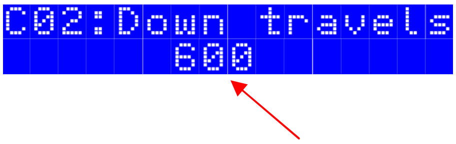
4.3 - COUNTERS

In this mode, the status of 4 counters is displayed, providing information relating to the operation of the lift system.

The counters displayed are:

C 01	Number of up travels
C 02	Number of down travels
C 03	Number of door openings
C 04	Number of door closings

EXAMPLE:



By selecting for example C02, you will display the number of down travels carried out by the lift:

The number is incremented every 100 travels and for this reason the value displayed is always a multiple of 100.

To reset the count, press both buttons ← and → simultaneously.

4.4 - ACCESS

In this mode, you can customize the **Access Code** (after entering the currently valid code) and change the language (**Italian or English**).

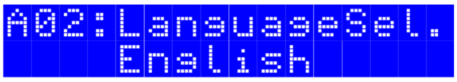
As already specified, SMS supplies the ELEMPU boards programmed with **Access Code = 00000000**.



Be careful to keep the access code, if you changed the default factory setting.



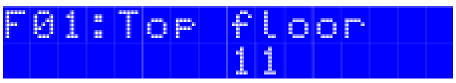
To change the code, use the keys ←,→,↓,↑ as described in the Table "Function of the keys" and confirm with **OK**



4.5 - FUNCTIONS

This mode allows configuring the ELEMPU board, i.e. to insert the specific data of the lift, choose the desired options among those available, and modify the preset times, if needed.

All the FUNCTIONS, with the available settings and the default values are listed in the **ANNEX 2 - FUNCTIONS FOR SYSTEM CONFIGURATION.**



Example F01: Top Floor
Sets the number of lift stops (Top Floor - 11).

The functions can be selected by scrolling through the menu using the keys ↓ and ↑ .

The selected function can be changed as follows:

- Press → , the current value of the function flashes on the bottom line of the display.
- Use keys ↓ or ↑ to increase or decrease the value of the function.
- Use keys ← or → to go to the next or previous digit of the function, if it is a function of a numeric type.
- When the function assumes the desired value, press **OK** to save it or press ← to exit without saving the change.

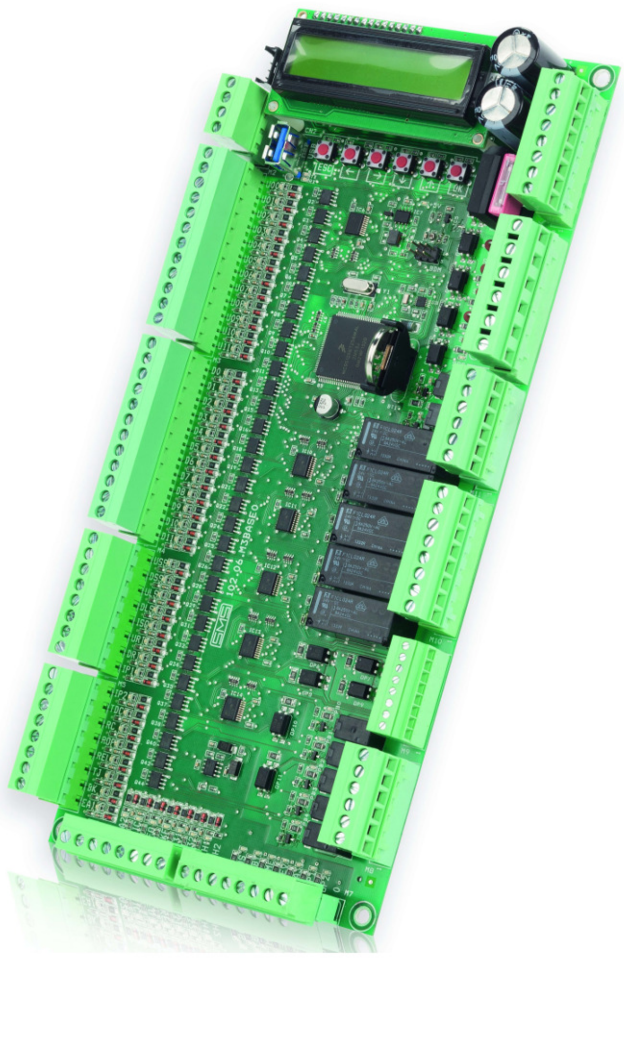
4.6 - SETTINGS

This functionality is not yet implemented in this version of the ELESYS System.

ELEMPU

Board

MASTER



5 – ELEMPU BOARD DIMENSIONS AND FASTENING

Dimensions: 120 x 274,6 mm

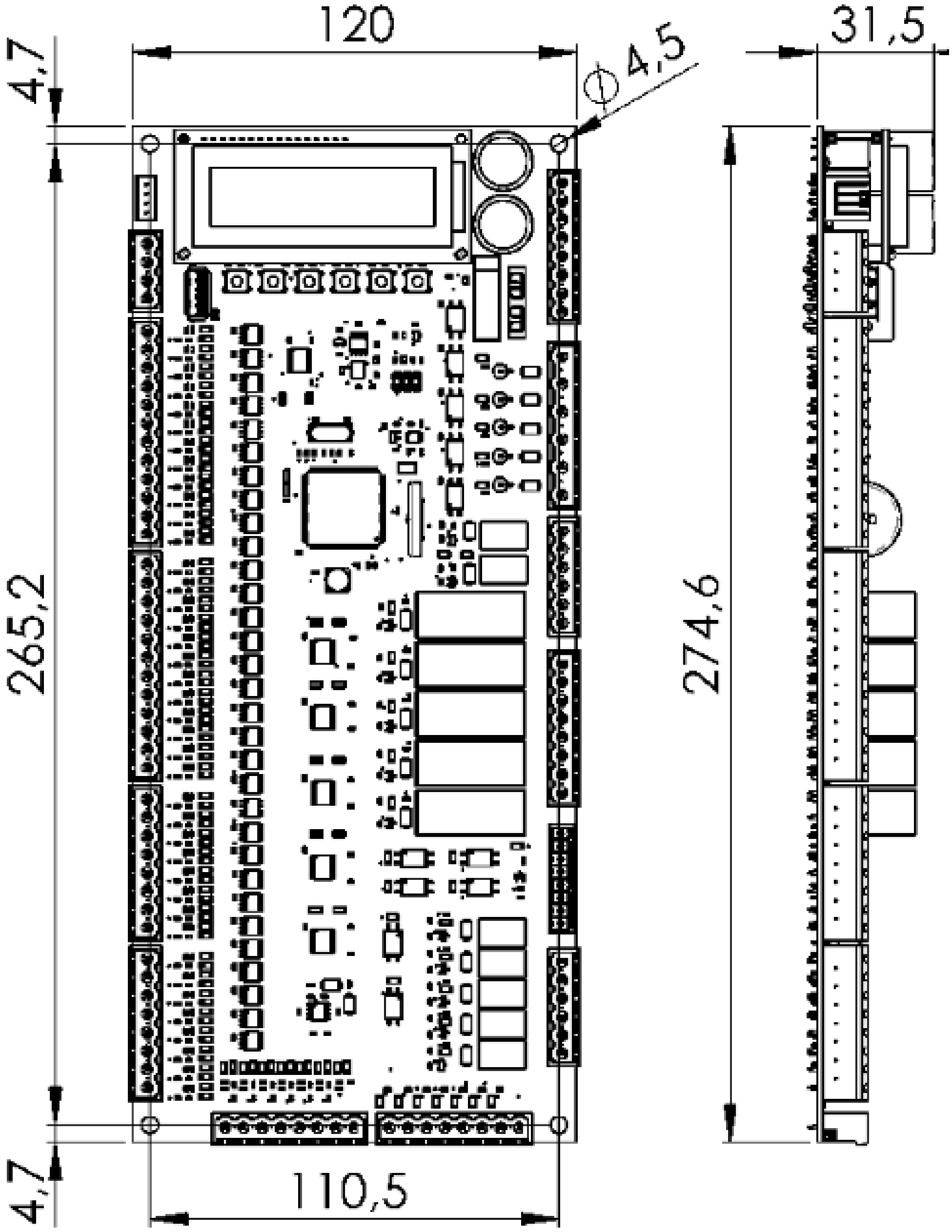


Fig. 3

6 – ELEMPU BOARD ELECTRICAL SPECIFICATIONS

Board supply voltage :	18Vac +/- 10% (terminals 18V~ - 18V~ / M13), protected by replaceable fuse 4A .
Supply Output Inputs / Outputs:	24Vdc (terminals 24V – 0V / M13)

ATTENTION **Do not supply the board with a different voltage. In addition the negative of the 24Vdc voltage (terminals 0V / M13) <u>MUST NOT</u> be connected to EARTH.**

INPUTS

The status of each input is indicated by the relative GREEN LED.

NOTE: For the inputs from car and landing call buttons, since they are common with the relative output, the LED is RED

5 Optoisolated inputs for the control of the state of safety chain (Terminal Block M12) Allowed voltage: 24 ÷ 110V AC/DC.

These inputs are made in accordance with the HARMONIZED STANDARDS EN81, the negative pole of the voltage that supply the safety chain is the terminal **SCC (M12 and M10), which MUST be connected to GROUND**.

46 Inputs 24Vdc (Terminal blocks M2 ÷ M6) for the signals coming from car and landing call buttons, switches for slowing down and stop, maintenance control box, photocells, etc. (See detailed list in Chapter 8 or 13).

All the input circuits are protected against line noises and voltage surges.

1 Input for thermistors, for motor thermal protection (terminals TH1 – TH2 / M6).

Motor thermistors should be directly connected to the board; when the protection is not active, the corresponding green LED is on.

OUTPUTS

The status of each output is displayed by the relative RED LED.

N° 5 Relay Outputs for:
- Motor contactors (Up (UP), Down (DN), High/Low Speed (HS/LS) - Terminal Block M10)
- Occupied signal/Car Light (EC - Terminal Block M11)

Dry contacts are available in the terminal block of the above mentioned relays, which have the following features:

Nominal voltage:	250Vac
Rated load AC15:	400VA
Break power DC1:	110V 0.3 A

Since the commands of motor contactors can be connected downstream of safety circuits, insulation distances comply with the requirements specified in Annex H of the Harmonized Standards EN81.

7 Relay Outputs for:
- Door controls (1 entrance) (Opening (DO), Closing (DC) - Terminal Block M11))
- Control of Car Position signal in binary code (PB0 ÷ PB4 - Terminal Block M8)

Dry contacts are available in the terminal block of the above mentioned relays, which have the following features:

Switching power:	0.5A/125Vac	1A/30Vdc
Max switching voltage (AC/DC):	125Vac/ 60Vdc	

The common terminal of position signal (CP) is voltage free.

24 Transistor Outputs for **COMING** or **REGISTERED** signal (Terminal blocks M2 – M3).
Maximum current supplied by each output = **250mA**.
The output transistors are protected against short circuit.

7 Transistor Outputs (Terminal block M7), for optional controls such as Out of Service, Next Leaving, Releveling, Emergency, etc.
Maximum current supplied by every output = **250mA**.
The output transistors are protected against short circuit.
The outputs connected to terminal block M7 can be connected directly to external signals or relays, with **24VDC** coil.
The load must be connected between the corresponding terminal and **0V**, as indicated in the example in Fig. 4 for the Out of Service (OS) signal.
Always connect a diode in parallel with the coil of any relay, as indicated in Fig. 4.

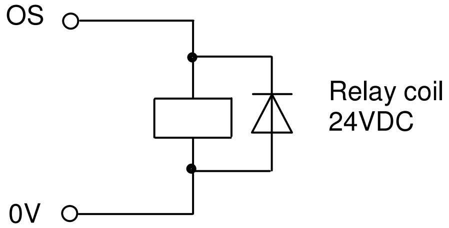


Fig. 4

N° 6 Outputs with Photocoupler (Terminal Block M9), for direct commands to the inverter: Up, Down, High Speed, Low speed, Inspection speed, Emergency

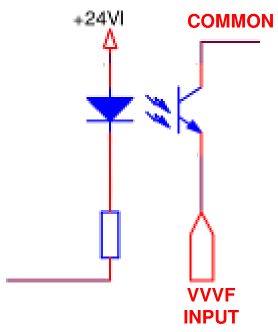


Fig. 5

N° 1 CAN BUS serial port for ELEPLUS connection

N° 1 RS485 serial port for service functions

N° 1 USB port for PC connection

7 –ELEMPU BOARD LAYOUT

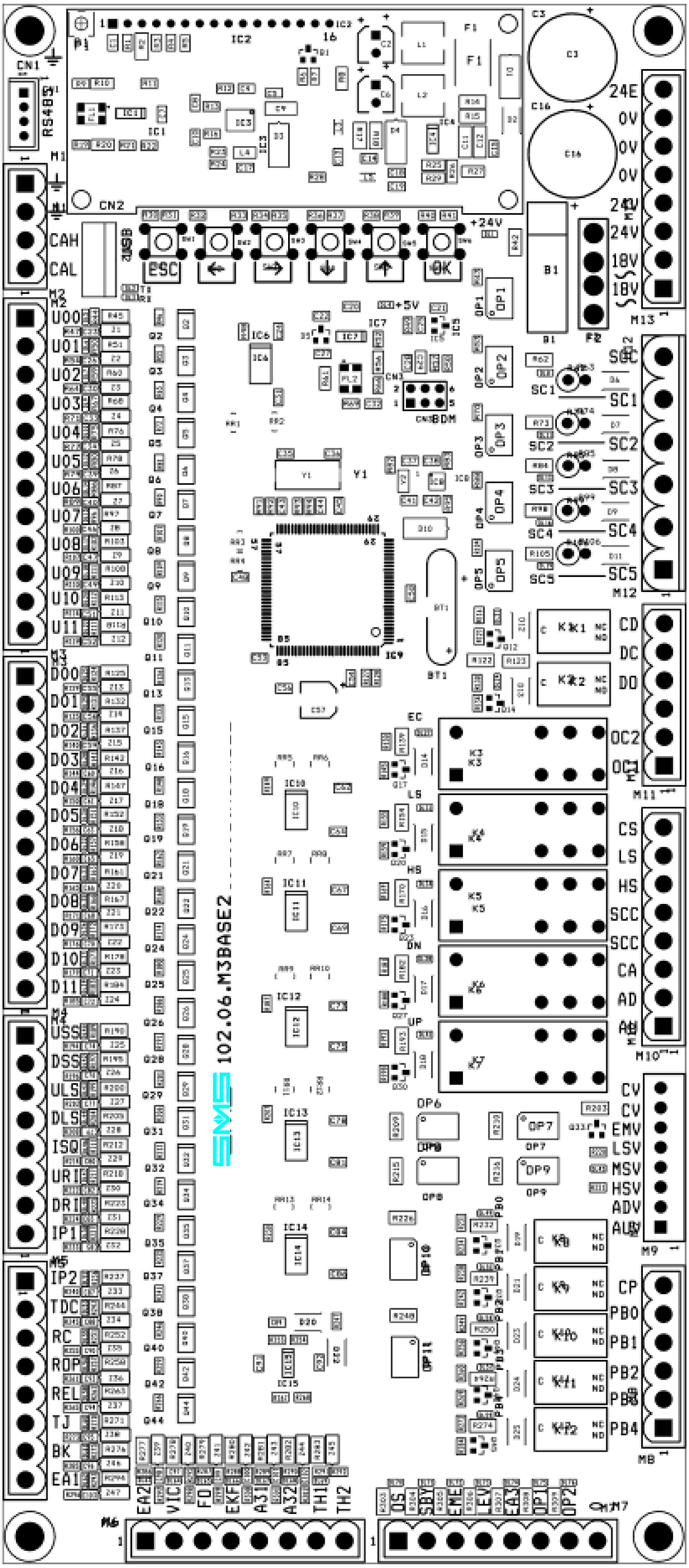
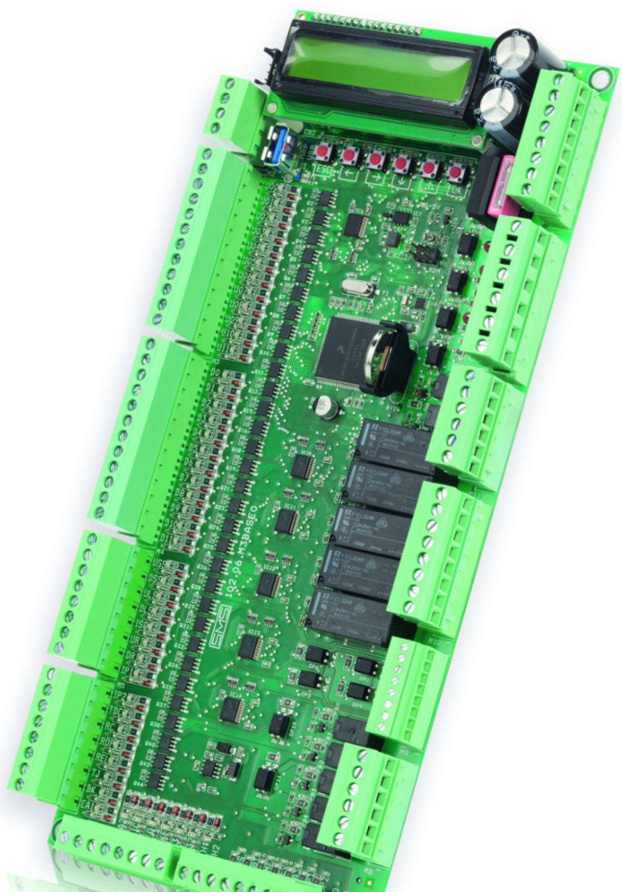


Fig. 6

CONNECTIONS
AND DIAGRAM EXAMPLES
FOR

ELEMPU Board

For STAND-ALONE applications with parallel communications only



8 – CONNECTIONS OF ELEMPU BOARD – STAND-ALONE

For STAND-ALONE application of the ELEMPU Board
SET F51 = NO

INPUTS / OUTPUTS

TERMINAL BLOCKS M2 - M3

<table>
<tr><th rowspan="2">LABEL</th><th colspan="4">OPERATION:</th></tr>
<tr><th colspan="2">AUTOMATIC PUSH BUTTON (A.P.B.)</th><th>↓DOWN COLLECTIVE</th><th>FULL COLLECTIVE</th></tr>
<tr><td>U00</td><td colspan="2">Car and Landing call Floor 0</td><td>Car control Floor 0</td><td>Up landing call Floor 0</td></tr>
<tr><td>U01</td><td colspan="2">Car and Landing call Floor 1</td><td>Car control Floor 1</td><td>Up landing call Floor 1</td></tr>
<tr><td>U02</td><td colspan="2">Car and Landing call Floor 2</td><td>Car control Floor 2</td><td>Up landing call Floor 2</td></tr>
<tr><td>U03</td><td colspan="2">Car and Landing call Floor 3</td><td>Car control Floor 3</td><td>Up landing call Floor 3</td></tr>
<tr><td>U04</td><td colspan="2">Car and Landing call Floor 4</td><td>Car control Floor 4</td><td>Up landing call Floor 4</td></tr>
<tr><td>U05</td><td colspan="2">Car and Landing call Floor 5</td><td>Car control Floor 5</td><td>Up landing call Floor 5</td></tr>
<tr><td>U06</td><td colspan="2">Car and Landing call Floor 6</td><td>Car control Floor 6</td><td>Up landing call Floor 6</td></tr>
<tr><td>U07</td><td colspan="2">Car and Landing call Floor 7</td><td>Car control Floor 7</td><td>---</td></tr>
<tr><td>U08</td><td colspan="2">Car and Landing call Floor 8</td><td>Car control Floor 8</td><td>---</td></tr>
<tr><td>U09</td><td colspan="2">Car and Landing call Floor 9</td><td>Car control Floor 9</td><td>Down landing call Floor 1</td></tr>
<tr><td>U10</td><td colspan="2">Car and Landing call Floor 10</td><td>Car control Floor 10</td><td>Down landing call Floor 2</td></tr>
<tr><td>U11</td><td colspan="2">Car and Landing call Floor 11</td><td>Car control Floor 11</td><td>Down landing call Floor 3</td></tr>
<tr><td>D00</td><td>Car at Floor 0</td><td rowspan="12">DECIMAL CAR POSITION Signal (one output per floor)</td><td>Up landing call Flor 0</td><td>Down landing call Floor 4</td></tr>
<tr><td>D01</td><td>Car at Floor 1</td><td>Down landing call Floor 1</td><td>Down landing call Floor 5</td></tr>
<tr><td>D02</td><td>Car at Floor 2</td><td>Down landing call Floor 2</td><td>Down landing call Floor 6</td></tr>
<tr><td>D03</td><td>Car at Floor 3</td><td>Down landing call Floor 3</td><td>Down landing call Floor 7</td></tr>
<tr><td>D04</td><td>Car at Floor 4</td><td>Down landing call Floor 4</td><td>Car control Floor 0</td></tr>
<tr><td>D05</td><td>Car at Floor 5</td><td>Down landing call Floor 5</td><td>Car control Floor 1</td></tr>
<tr><td>D06</td><td>Car at Floor 6</td><td>Down landing call Floor 6</td><td>Car control Floor 2</td></tr>
<tr><td>D07</td><td>Car at Floor 7</td><td>Down landing call Floor 7</td><td>Car control Floor 3</td></tr>
<tr><td>D08</td><td>Car at Floor 8</td><td>Down landing call Floor 8</td><td>Car control Floor 4</td></tr>
<tr><td>D09</td><td>Car at Floor 9</td><td>Down landing call Floor 9</td><td>Car control Floor 5</td></tr>
<tr><td>D10</td><td>Car at Floor 10</td><td>Down landing call Floor 10</td><td>Car control Floor 6</td></tr>
<tr><td>D11</td><td>Car at Floor 11</td><td>Down landing call Floor 11</td><td>Car control Floor 7</td></tr>
</table>

Table 2 – Configuration of Landing calls and Car controls for ELEMPU STAND-ALONE

To each CAR and/or LANDING CALL is linked a signal, COMING in the event of A.P.B. operation, or REGISTERED in case of COLLECTIVE operation.
These signals must be connected to the same terminals provided for the buttons, as shown in Figure 7 (only one wire for the connection of button/lamp to the board):

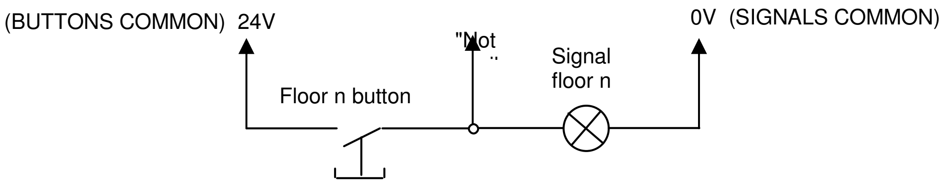


Fig. 7

CAR POSITION signals in decimal code are supplied by 24Vdc (Max load = 250mA) with short-circuit protection.
In case you use a display, this <u>MUST</u> be of <u>NEGATIVE COMMON</u> (common cathode type).

INPUTS 24Vdc

TERMINAL BLOCKS M4 - M5 - M6

All INPUTS connected to the above terminal blocks are contacts or switches supplied by 24Vdc. Therefore, they must be connected between the common 24V and the corresponding terminal, except for the EKF and THERMISTORS inputs described in the following.

<table>
<tr><th>LABEL
M4</th><th>DESCRIPTION</th></tr>
<tr><td>**USS**
DSS</td><td>UP STOP SWITCH (DOWNWARD SLOWDOWN)
DOWN STOP SWITCH (UPWARD SLOWDOWN)

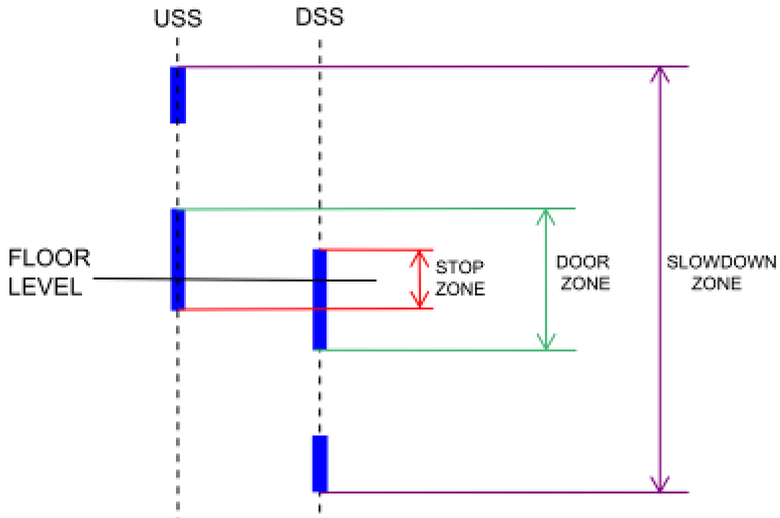


Fig. 8

The contacts of USS and DSS can be of NO or NC type, with appropriate programming.

If necessary, for example due to the speed of the system or to the distance between the floors, the magnets that control the slowdown can "cross", i.e. the magnet, which controls the slowdown to the next floor may be positioned immediately after the magnets of floor zone (stop/door zone). No programming is required for the board. The software adjusts automatically.
It is however required to provide a distance of a few centimetres between the floor zone magnets and the slow down on, to allow the correct reading of the input (this distance depends on the system speed); usually 5 cm are sufficient, and therefore the **minimum distance between floors** allowed is equal to the **slowdown space + door unlock space + 5 cm**.</td></tr>
<tr><td>**ULS**
DLS</td><td>TOP FLOOR LIMIT SWITCH
BOTTOM FLOOR LIMIT SWITCH

The switches ULS and DLS must be of type NC and driven at end floors by a magnet with a length equal to slowdown distance minus 2 cm, as shown in the figure below.

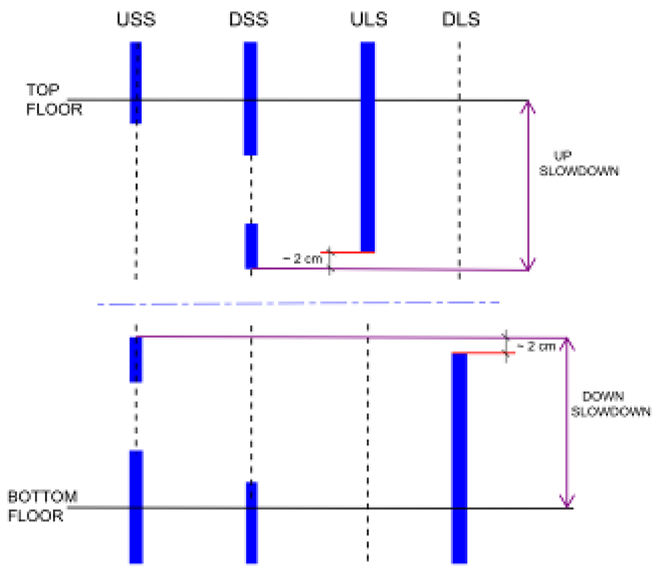


Fig. 9</td></tr>
</table>

LABEL *M4*	DESCRIPTION
ISQ	INSPECTION BOX CONTACT It must be CLOSED with the system in NORMAL service, and OPEN in INSPECTION state. If there are multiple Inspection buttons (on car roof, in the control panel, in the shaft, etc.) the relative contacts must be connected in series. In the SAFETY CHAIN must be provided contacts to disable the INSPECTION operation, if activated by different inspection boxes.
URI	INSPECTION UP BUTTON
DRI	INSPECTION DOWN BUTTON
IP1	In this configuration of ELEMPU assumes the function: **PE1** - PHOTOCELL and SAFETY EDGE CONTACT It must be CLOSED with beam free, and OPEN with beam interrupted.

LABEL *M5*	DESCRIPTION
IP2	In this configuration of ELEMPU assumes the function: **OCI** - CAR SWITCH OVERLOAD (load > 110% loading capacity) Contact CLOSE with car overload. In this configuration the ELEMPU board is not provided with an output for the relative signal, which therefore must be controlled directly by the input, connecting it between IP2 and 0V.
TDC	CONTACTOR DROP-OUT DELAY: Active input for VVVF drive only. Connect the output of the VVVF dedicated to the control of the contactors. If not connected, the drop-out of the contactors in VVVF drive mode is controlled with a delay with respect to the stop command (set in parameter F17).
RC	RUN CONTACTORS CONTROL: Connect to the auxiliary contacts of contactors that control the motor, where an eventual sticking" could bring to a dangerous operation. It is possible to program if the input must be active during RUN (contacts N. A. in parallel) or active with car STOPPED (contacts N.C. in series)
ROP	EMERGENCY OPERATION ACTIVATION: See description of operation in Chapter 3.7
REL	RELEVELING ENABLE CONTACT: Connect to an auxiliary contact of the SAFETY CIRCUIT which enables releveling with open doors and that provides the door contact by-pass - see Chapter 3.5 .
TJ	In this configuration of ELEMPU assumes the function: **DOL** – DOOR OPEN LIMIT SWITCH Connect to 24V if not used – see example of drawing at pages 29-30.
BK	In this configuration of ELEMPU it assumes 2 different functions depending on the type of operation, namely: - **EC** - OCCUPIED CAR (load ≥ 1 person) in AUTOMATIC PUSH BUTTON operation (A.P.B.) if CLOSE, it maintains the "OCCUPIED" output active - **FC** - FULL CAR (load > 80% loading capacity) in COLLECTIVE operation if CLOSE, the car starts only to serve the car calls and ignores the landing calls, that remain stored in order to be served at FC opening.
EA1	EXTERNAL ALARM 1: The opening of this input causes the OUT OF SERVICE with immediate stop of the car. It can be connected, for example at the contact of the MAINS PHASE CONTROL device or at FAULT contact of the VVVF. When the input closes again after an opening, the lift automatically returns to service with a reset operation. Connect a 24V if not used.

LABEL *M6*	DESCRIPTION
EA2	EXTERNAL ALARM 2: The opening of this input causes the car to stop at the end of the current travel. It can be connected for example to the contact of the oil thermostat. Connect to 24V if not used.
VIC	V.I.P. CALL: See description of operation in Chapter 3.8
FO	CONTACT FOR ENABLING FIRE-FIGHTERS OPERATION: See Chapter 3.9
EKF	KEY SWITCH EXTERNAL TO THE CAR: To activate the PHASE 2 of the fire-fighter operation as per EN81-72 – See Chapter 3.9 Connect the key between the EKF terminal and the OS terminal (M7). The input must be in OFF state if the PHASE 2 is not active (N.O. contact).
A31	In this configuration of ELEMPU it assumes the function: **ODB** – DOOR OPENING BUTTON Contact normally closed, the action on the button controls the opening of the doors - connect to 24V if not used.
A32	In this configuration of ELEMPU it assumes the function: **CDB** – DOOR QUICK CLOSING BUTTON - Enabled for COLLECTIVE operation only
TH1 **TH2**	MOTOR THERMISTORS Make a jumper between TH1 and TH2 if not used

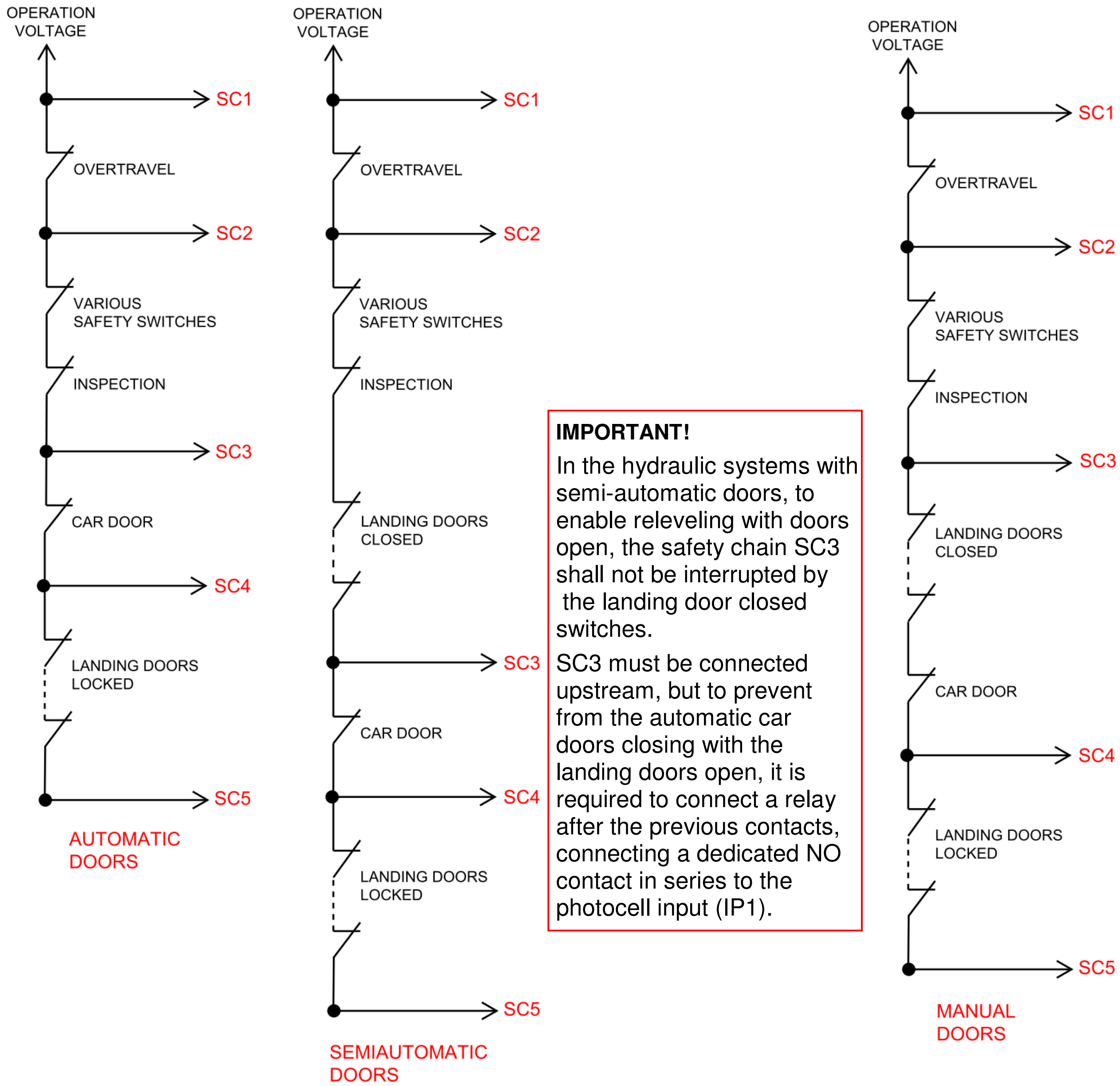
SAFETY CHAIN INPUTS

TERMINAL BLOCK M12

Optoisolated inputs for the control of the state of safety circuits.

LABEL	**DESCRIPTION**
SCC	VOLTAGE REFERENCE OF SAFETY CIRCUITS: GROUNDED on the control panel.
SC1	SAFETY CHAIN BEGINNING: Downstream of the OPERATIN AUTOMATIC VALVE
SC2	1st SECTION OF SAFETY CHAIN: Downstream of the OVERTRAVEL switch, that must be the 1st of the series
SC3	2nd SECTION OF SAFETY CHAIN: Downstream of VARIOUS SAFETY SWITCHES (STOP SWITCH IN THE PIT, OVERSPEED GOVERNOR, OVERSPEED GOVERNOR TENSION DEVICE, SAFETY GEAR, etc.), of the NORMAL SERVICE / INSPECTION SWITCH, of the LANDING DOOR CLOSED CONTACTS (for SEMIAUTOMATIC doors only)
SC4	3rd SECTION OF SAFETY CHAIN: Downstream of the CAR DOOR CONTACT
SC5	4th SECTION OF SAFETY CHAIN: Downstream of the LANDING DOOR LOCKED CONTACTS

EXAMPLES OF SAFETY CHAIN CONNECTION FOR DIFFERENT DOOR TYPES



IMPORTANT!

In the hydraulic systems with semi-automatic doors, to enable releveling with doors open, the safety chain SC3 shall not be interrupted by the landing door closed switches.

SC3 must be connected upstream, but to prevent from the automatic car doors closing with the landing doors open, it is required to connect a relay after the previous contacts, connecting a dedicated NO contact in series to the photocell input (IP1).

Fig. 10

RELAY OUTPUTS

TERMINAL BLOCK M10

Direction and speed controls

LABEL	DESCRIPTION
CS **LS** **HS**	COMMON HIGH/LOW SPEED CONTROLS LOW SPEED CONTROL HIGH SPEED CONTROL
SCC	Connect the VOLTAGE REFERENCE OF SAFETY CHAIN (connected to GROUND on the control panel) to ensure the insulation between the circuits.
CA **AD** **AU**	COMMON UP/DOWN CONTROLS DOWN CONTROL UP CONTROL

TERMINAL BLOCK M11

Automatic doors and "Occupied" controls

LABEL	DESCRIPTION
CD **DC** **DO**	COMMON DOOR OPENING/CLOSING CONTROLS DOOR CLOSING CONTROL DOOR OPENING CONTROL
OC1 **OC2**	N.O. contact of EC relay Assumes a different function based on the type of operation, such as: - OCCUPIED SIGNAL in AUTOMATIC PUSH BUTTON (A.P.B.) operation Connect an external relay with N.C. contact to disable calls from the floors – See the diagram example in Chapter 8.1. - CAR LIGHT CONTROL in COLLECTIVE operation

TERMINAL BLOCK M8

Commands for CAR POSITION Signal in BINARY code

LABEL	DESCRIPTION
CP	CAR POSITION SIGNALS POWER SUPPLY: The CP terminal is voltage free, and must be connected to the supply voltage required by the display.
PB0	BIT0 CAR POSITION DECODING
PB1	BIT1 CAR POSITION DECODING
PB2	BIT2 CAR POSITION DECODING
PB3	BIT3 CAR POSITION DECODING
PB4	BIT4 CAR POSITION DECODING

OUTPUTS WITH PHOTOCOUPLER

TERMINAL BLOCK M9

Commands for VVVF DRIVE

LABEL	DESCRIPTION
CV	VVVF COMMAND COMMON
EMV	EMERGENCY
LSV	LOW SPEED
MSV	INSPECTION SPEED
HSV	HIGH SPEED
ADV	DOWN RUN
AUV	UP RUN

TRANSISTOR OUTPUTS 24Vdc

TERMINAL BLOCK M7

LABEL	DESCRIPTION
OS	OUT-OF-SERVICE: ACTIVE output in normal operation, NOT ACTIVE in out-of-service - It is recommended to control an external relay which has the N.O. contact upstream of the safety chain.
SBY	In this configuration of ELEMPU assumes the function: **NDS** – direction (A.P.B. operation) /next leaving (COLLECTIVE operation) DOWN Signal.
EME	SYSTEM IN EMERGENCY
LEV	SYSTEM RELEVELING: Control an external relay, where NO contact is placed in series with the contact of the SAFETY CIRCUIT which provides the by-pass of the contacts of the doors - see functional description and example of diagram to Chapter 3.5.
EA3	In this configuration of ELEMPU assumes the function: **NUS** - direction (A.P.B. operation) /next leaving (COLLECTIVE operation) UP Signal.
OP1	In this configuration of ELEMPU assumes the function: **GONG** - acoustic signal of coming car.
OP2	In this configuration of ELEMPU assumes the function: **CAM** – RETIRING CAM control.

POWER SUPPLY

TERMINAL BLOCK M13

LABEL	DESCRIPTION
24E	AUXILIARY POWER SUPPLY (not used)
0V **24V**	24Vdc OUTPUT SUPPLY FOR SWITCHES – PUSH-BUTTONS – RELAYS – S IGNALS etc. ⚠ **Do not connect external supply to these terminals**
18V~ **18V~**	18Vac INPUT POWER SUPPLY FOR THE BOARD, from external INSULATION TRANSFORMER

9 – EXAMPLES OF DIAGRAMS

In this chapter are given a few examples of diagrams with ELEMPU board:

9.1 - A.P.B. OPERATION – 2 SPEED

9.2 - A.P.B. OPERATION – HYDRAULIC

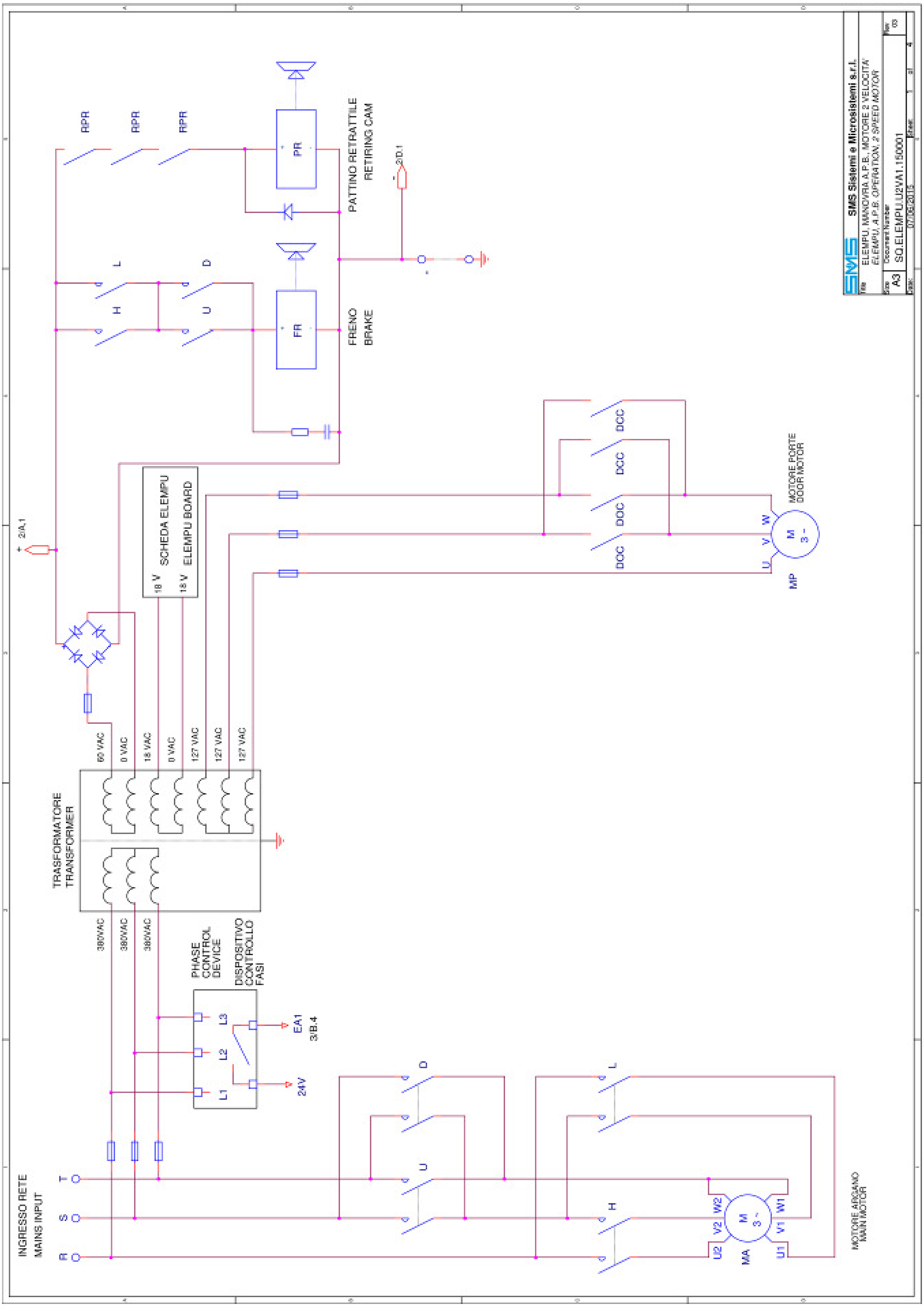
9.3 - FULL COLLECTIVE OPERATION – WITH VACON NXP VVVF DRIVE

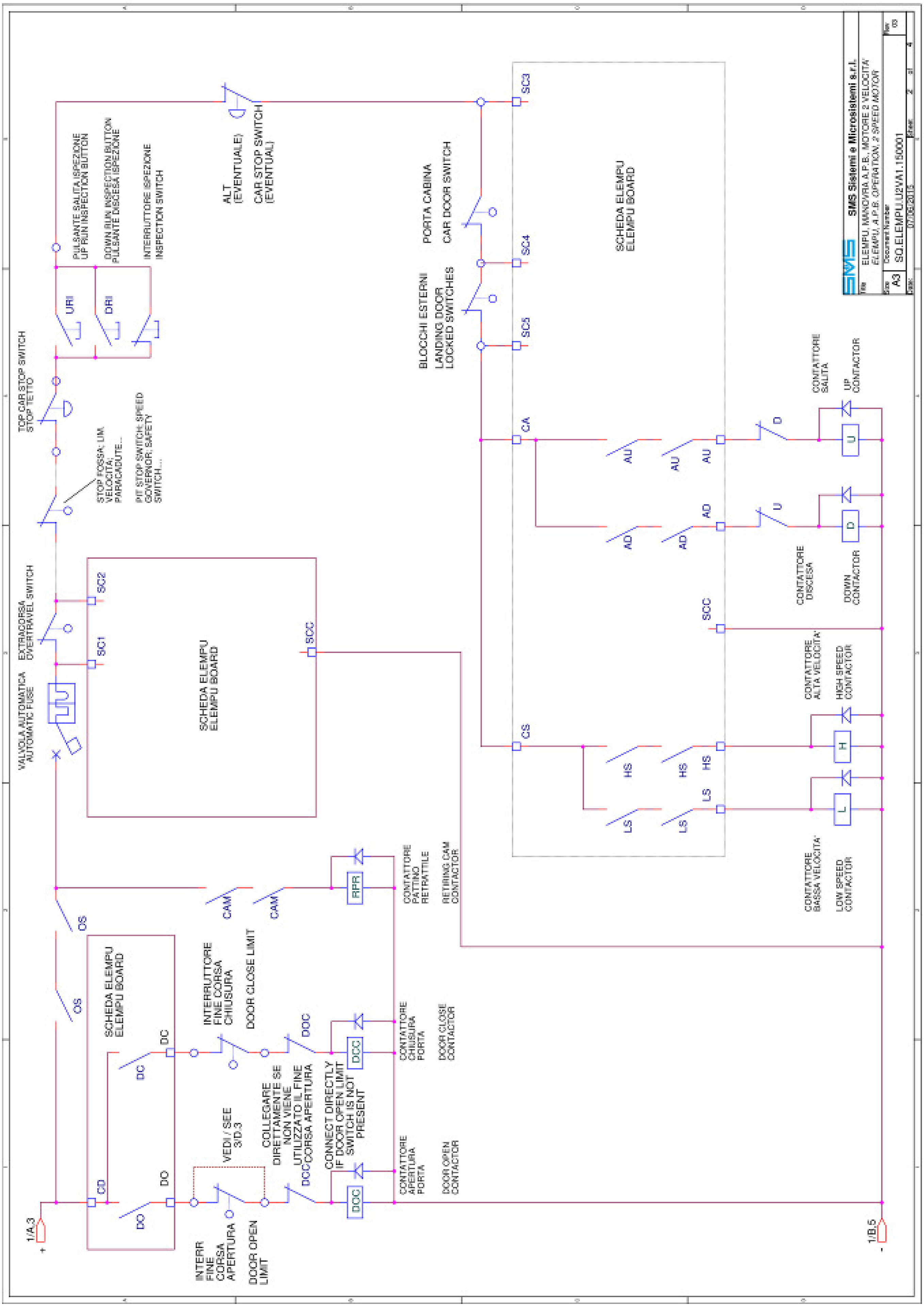
The connections of the safety chain and contactors must comply exactly the ones shown in the drawings, supply voltage can be changed, provided that it is compatible with the ELECTRICAL SPECIFICATIONS outlined in Chapter 6 of this Manual.

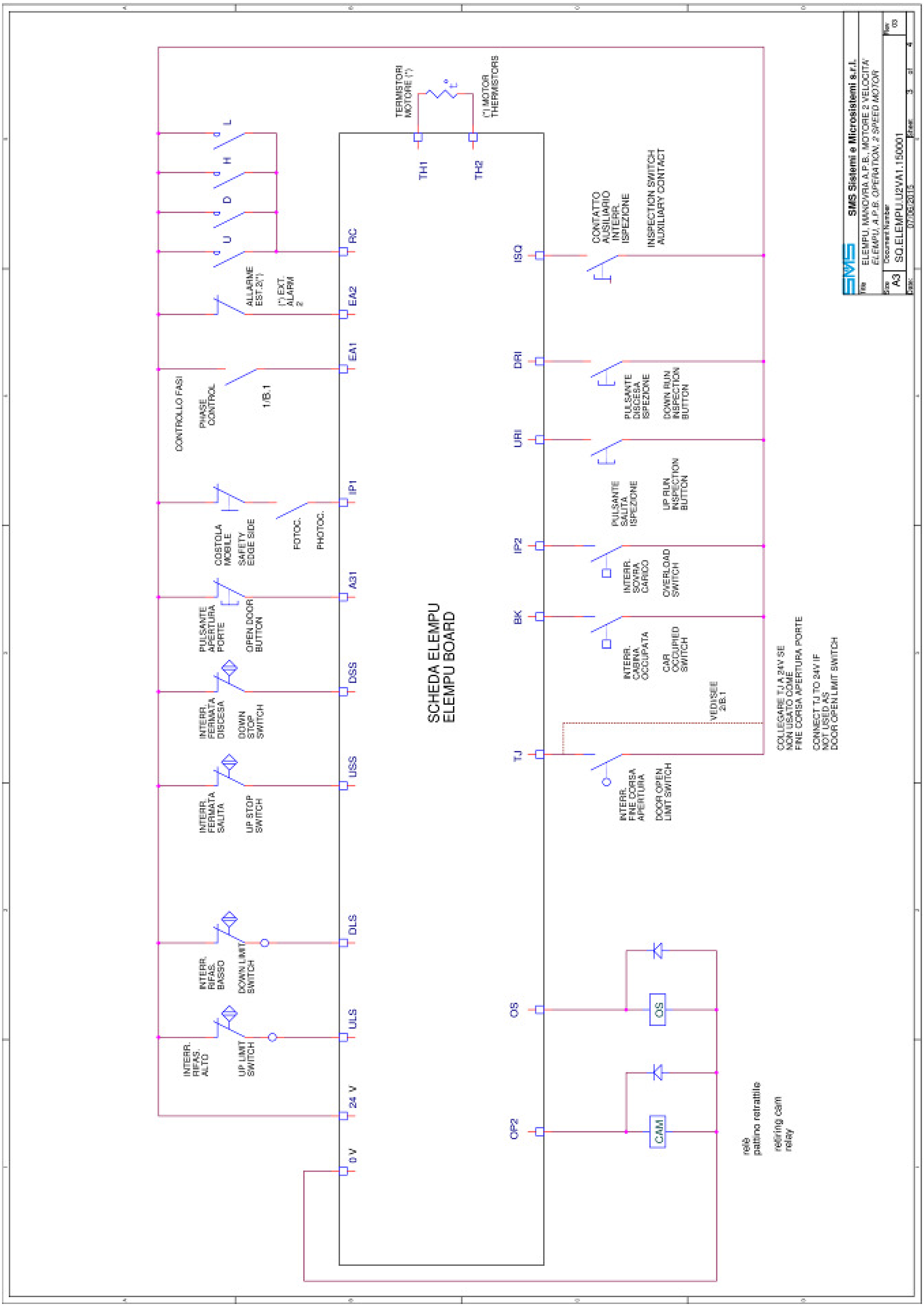
We have chosen to describe the doors motor, three-phase 125Vac, 50Hz type and an operating voltage of 48Vdc, but other solutions are also possible.

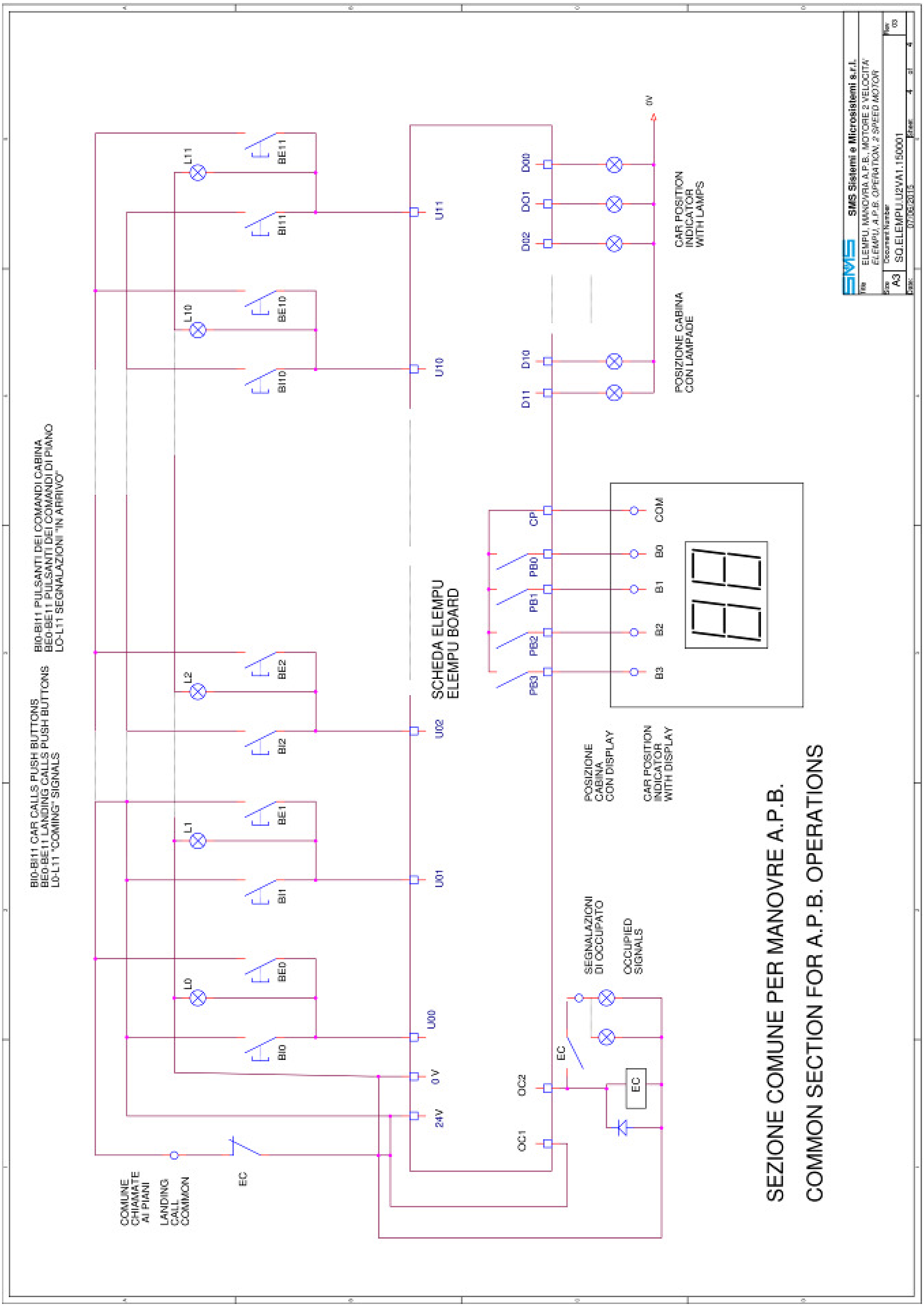
As a general rule, it is recommended ALWAYS to connect in parallel to the coils of relays, contactors, electromagnets, external to the board, a device for protection against surges, i.e. DIODES in the presence of DC voltage or directed voltage, or VARISTORS or RC FILTERS when it is important to quickly de-energize the equipment or in the presence of AC voltage.

9.1 - CONTROL PANEL DIAGRAM EXAMPLE - A.P.B. OPERATION – 2 SPEEDS

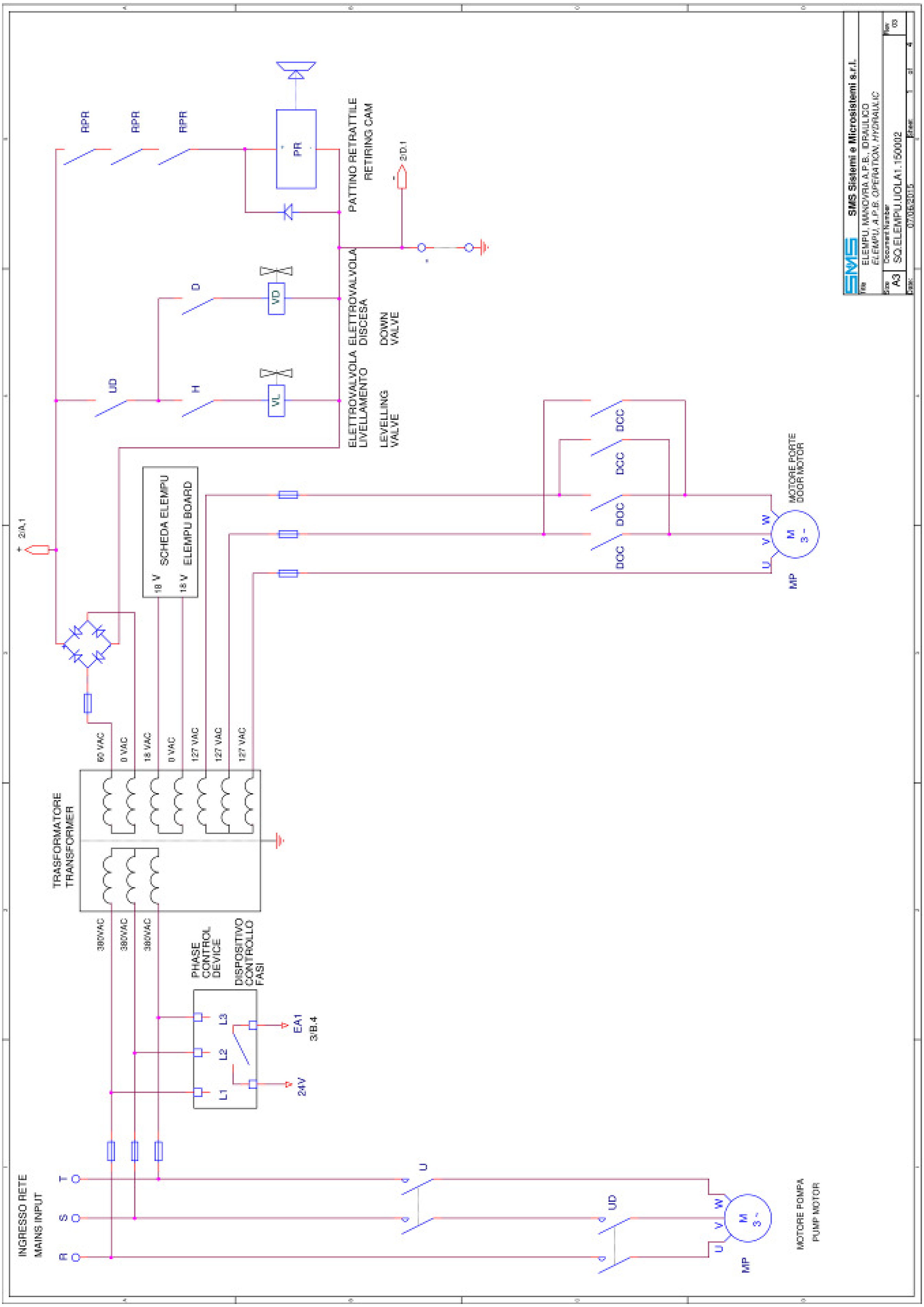


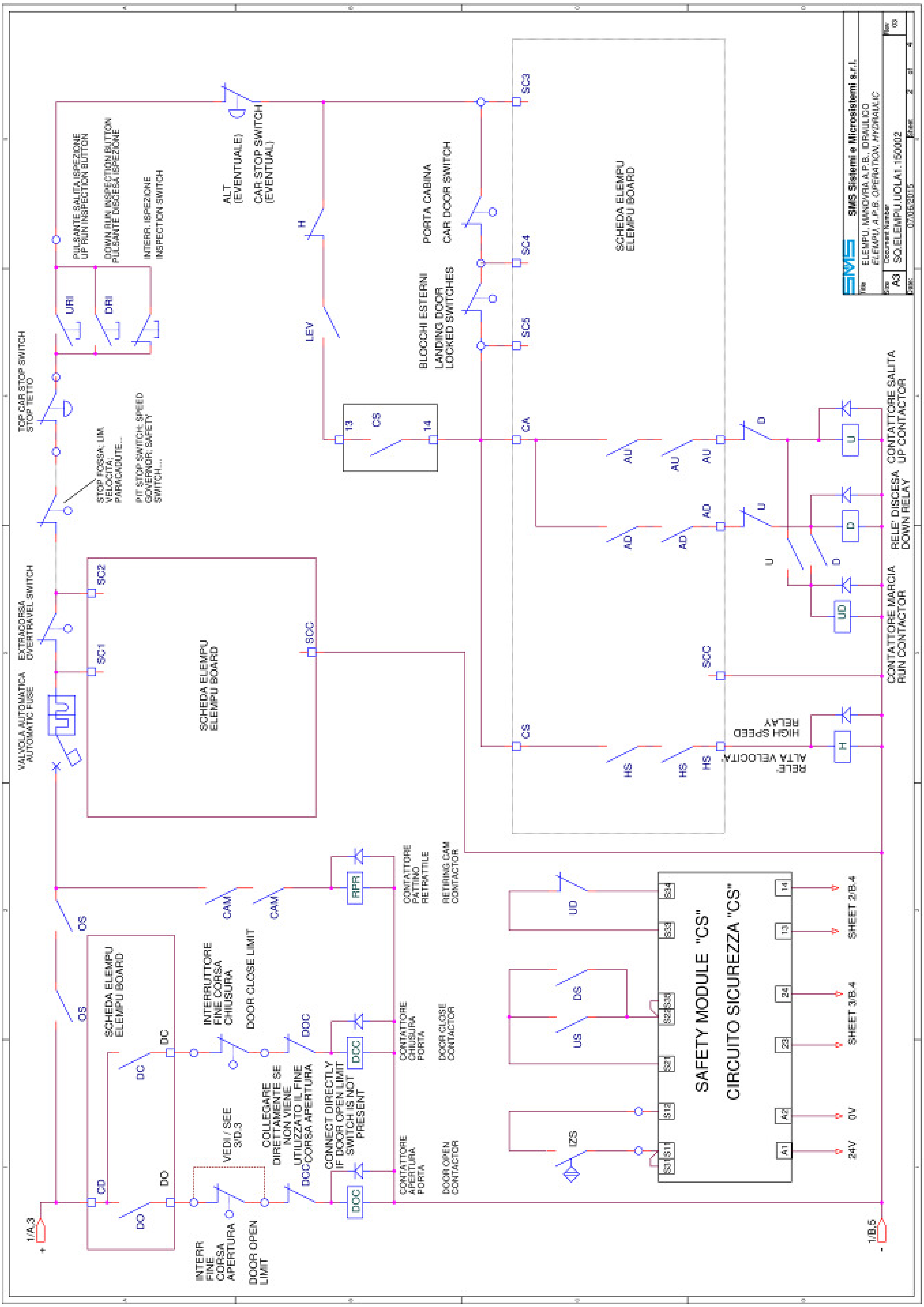

SMS Sistemi e Microsistemi s.r.l.
ELEMPU, MANOVRA A.P.B., MOTORE 2 VELOCITA'
ELEMPU, A.P.B. OPERATION, 2 SPEED MOTOR
A3
SQ.ELEMPU.U2VA1.150001
07/06/2015
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
DOWN RUN INSPECTION BUTTON
PULSANTE DISCESA ISPEZIONE
INTERRUTTORE ISPEZIONE
INSPECTION SWITCH
ALT
(EVENTUALE)
CAR STOP SWITCH
(EVENTUAL)
PORTA CABINA
CAR DOOR SWITCH
BLOCCHI ESTERNI
LANDING DOOR
LOCKED SWITCHES
SCHEDA ELEMPU
ELEMPU BOARD
TOP CAR STOP SWITCH
STOP TETTO
STOP FOSSA; LIM.
VELOCITA';
PARACADUTE...
PIT STOP SWITCH; SPEED
GOVERNOR; SAFETY
SWITCH...
EXTRACORSA
OVERTRAVEL SWITCH
VALVOLA AUTOMATICA
AUTOMATIC FUSE
CONTATTORE
SALITA
UP
CONTACTOR
CONTATTORE
DISCESA
DOWN
CONTACTOR
CONTATTORE
ALTA VELOCITA'
HIGH SPEED
CONTACTOR
CONTATTORE
BASSA VELOCITA'
LOW SPEED
CONTACTOR
CONTATTORE
PATTINO
RETRATTILE
RETIRING CAM
CONTACTOR
INTERRUTTORE
FINE CORSA
CHIUSURA
DOOR CLOSE LIMIT
CONTATTORE
CHIUSURA
PORTA
DOOR CLOSE
CONTACTOR
VEDI / SEE
3/D.3
COLLEGARE
DIRETTAMENTE SE
NON VIENE
UTILIZZATO IL FINE
CORSA APERTURA
CONNECT DIRECTLY
IF DOOR OPEN LIMIT
SWITCH IS NOT
PRESENT
CONTATTORE
APERTURA
PORTA
DOOR OPEN
CONTACTOR
INTERR
FINE
CORSA
APERTURA
DOOR OPEN
LIMIT
1/A.3
1/B.5
SC1
SC2
SC3
SC4
SC5
SCC
CA
CS
CD
DC
DO
DOC
DCC
RPR
CAM
OS
URI
DRI
AU
AD
HS
LS
U
D
H
L


SCHEDA ELEMPU
ELEMPU BOARD
TERMISTORI MOTORE (*)
(*) MOTOR THERMISTORS
TH1
TH2
L
H
D
U
RC
ALLARME EST.2(*)
(*) EXT. ALARM 2
EA2
CONTROLLO FASI
PHASE CONTROL
1/B.1
EA1
COSTOLA MOBILE
SAFETY EDGE SIDE
FOTOC.
PHOTOC.
IP1
PULSANTE APERTURA PORTE
OPEN DOOR BUTTON
A31
INTERR. FERMATA DISCESA
DOWN STOP SWITCH
DSS
INTERR. FERMATA SALITA
UP STOP SWITCH
USS
INTERR. RIFAS. BASSO
DOWN LIMIT SWITCH
DLS
INTERR. RIFAS. ALTO
UP LIMIT SWITCH
ULS
24 V
0 V
ISQ
CONTATTO AUSILIARIO INTERR. ISPEZIONE
INSPECTION SWITCH AUXILIARY CONTACT
DRI
PULSANTE DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
URI
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
IP2
INTERR. SOVRA CARICO
OVERLOAD SWITCH
BK
INTERR. CABINA OCCUPATA
CAR OCCUPIED SWITCH
VEDI SEE 2/B.1
TJ
INTERR. FINE CORSA APERTURA
DOOR OPEN LIMIT SWITCH
COLLEGARE TJ A 24V SE NON USATO COME FINE CORSA APERTURA PORTE
CONNECT TJ TO 24V IF NOT USED AS DOOR OPEN LIMIT SWITCH
OS
OP2
CAM
relè pattino retrattile
retiring cam relay
SMS Sistemi e Microsistemi s.r.l.
ELEMPU, MANOVRA A.P.B., MOTORE 2 VELOCITA'
ELEMPU, A.P.B. OPERATION, 2 SPEED MOTOR
A3
SQ.ELEMPU.U2VA1.150001
07/06/2015
03

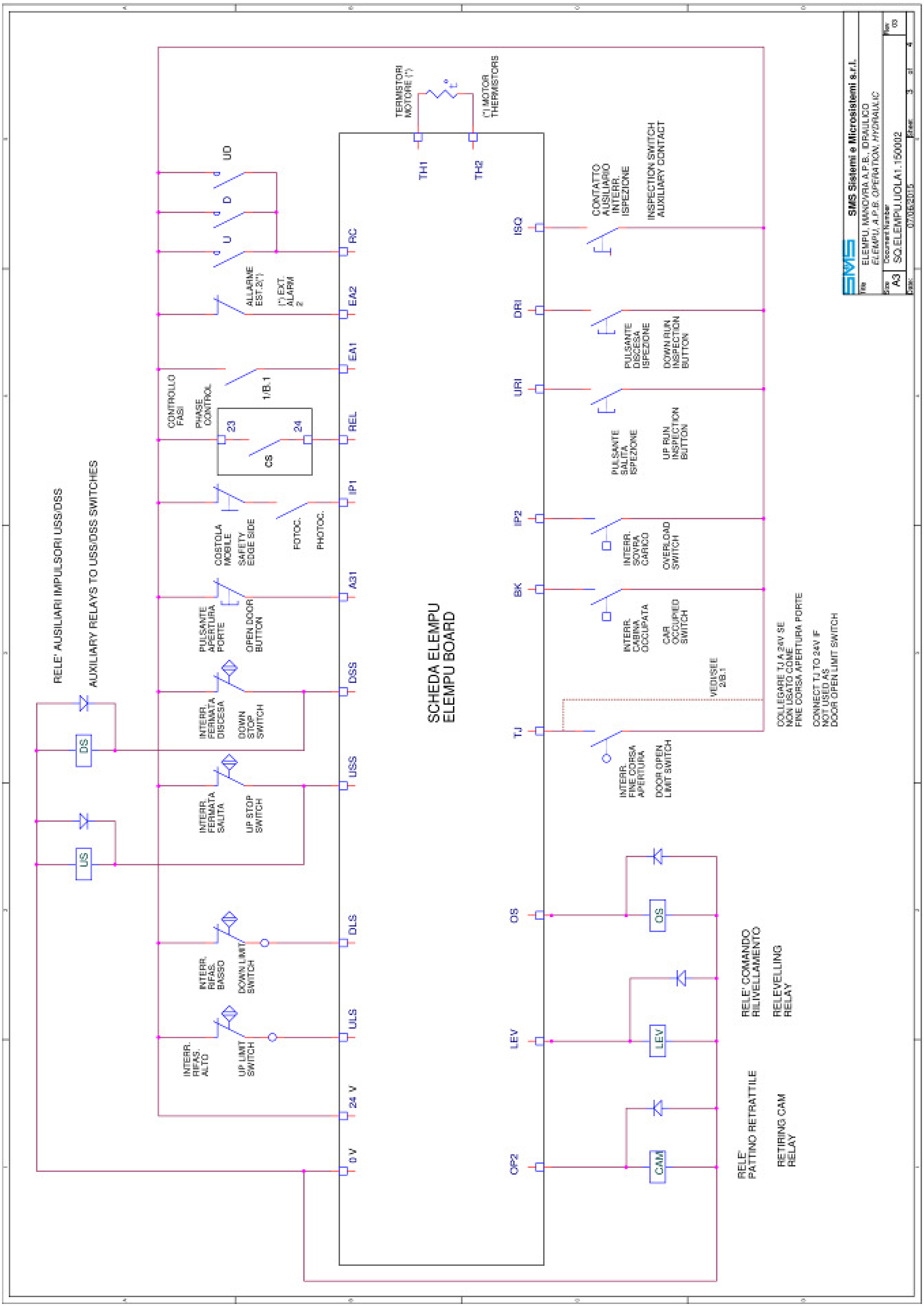

BI0-BI11 CAR CALLS PUSH BUTTONS
BE0-BE11 LANDING CALLS PUSH BUTTONS
L0-L11 "COMING" SIGNALS
BI0-BI11 PULSANTI DEI COMANDI CABINA
BE0-BE11 PULSANTI DEI COMANDI DI PIANO
L0-L11 SEGNALAZIONI "IN ARRIVO"
SCHEDA ELEMPU
ELEMPU BOARD
U00
U01
U02
U10
U11
0 V
24V
OC1
OC2
EC
COMUNE CHIAMATE AI PIANI
LANDING CALL COMMON
D00
D01
D02
D10
D11
0V
CAR POSITION INDICATOR WITH LAMPS
POSIZIONE CABINA CON LAMPADE
CP
PB0
PB1
PB2
PB3
COM
B0
B1
B2
B3
POSIZIONE CABINA CON DISPLAY
CAR POSITION INDICATOR WITH DISPLAY
SEGNALAZIONI DI OCCUPATO
OCCUPIED SIGNALS
SEZIONE COMUNE PER MANOVRE A.P.B.
COMMON SECTION FOR A.P.B. OPERATIONS
SMS Sistemi e Microsistemi s.r.l.
ELEMPU, MANOVRA A.P.B., MOTORE 2 VELOCITA'
ELEMPU, A.P.B. OPERATION, 2 SPEED MOTOR
A3
SQ.ELEMPU.U2V.A1.150001

9.2 - CONTROL PANEL DIAGRAM EXAMPLE - A.P.B. OPERATION – HYDRAULIC



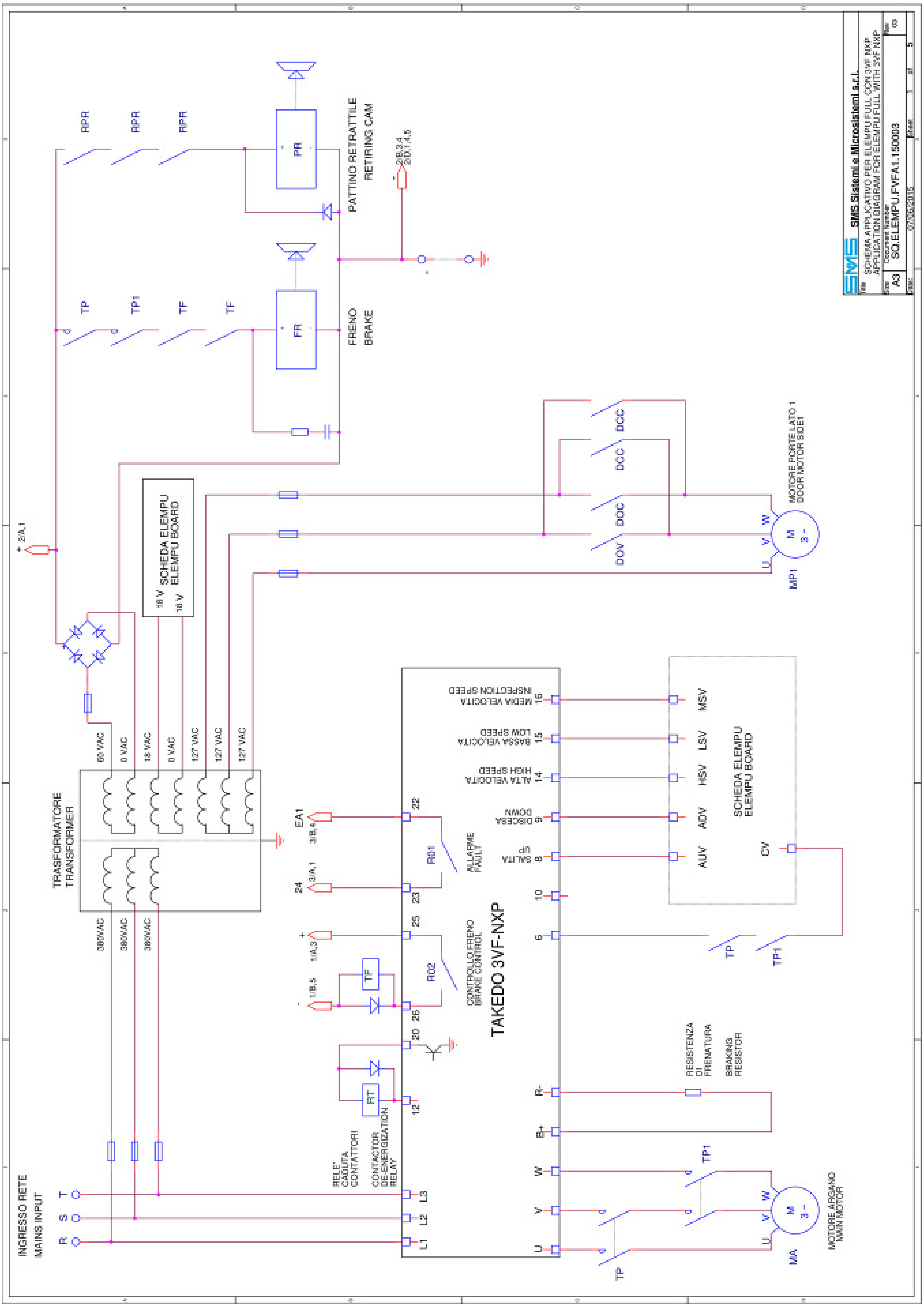


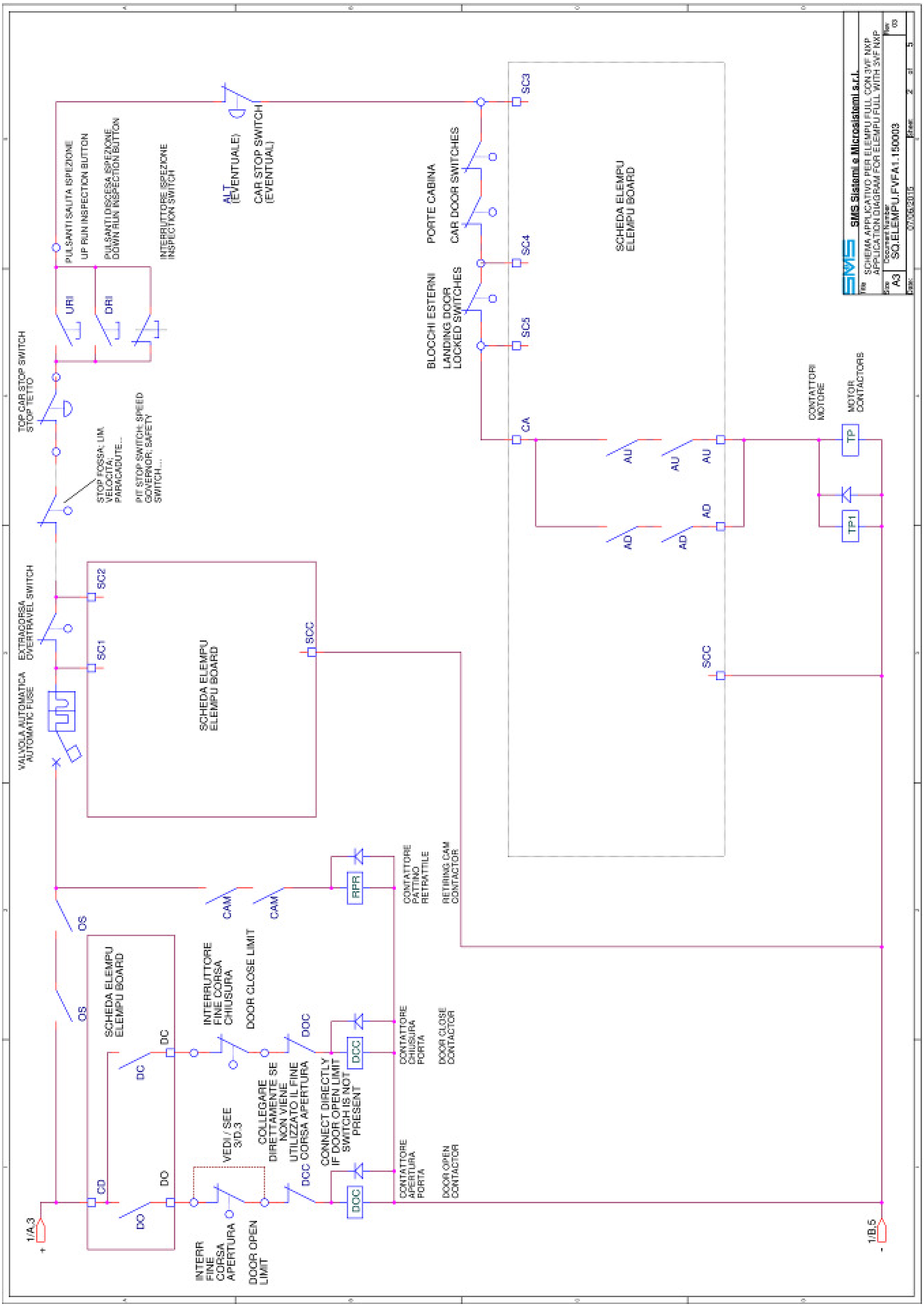
TOP CAR STOP SWITCH
STOP TETTO
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
DOWN RUN INSPECTION BUTTON
PULSANTE DISCESA ISPEZIONE
INTERR. ISPEZIONE
INSPECTION SWITCH
URI
DRI
ALT (EVENTUALE)
CAR STOP SWITCH (EVENTUAL)
H
LEV
PORTA CABINA
CAR DOOR SWITCH
BLOCCHI ESTERNI
LANDING DOOR LOCKED SWITCHES
SC3
SC4
SC5
SCHEDA ELEMPU
ELEMPU BOARD
STOP FOSSA; LIM. VELOCITA'; PARACADUTE...
PIT STOP SWITCH; SPEED GOVERNOR; SAFETY SWITCH...
EXTRACORSA
OVERTRAVEL SWITCH
VALVOLA AUTOMATICA
AUTOMATIC FUSE
SC1
SC2
SCC
CS
13
14
CA
AU
AD
HS
D
U
UD
CONTATTORE SALITA
UP CONTACTOR
RELE' DISCESA
DOWN RELAY
CONTATTORE MARCIA
RUN CONTACTOR
RELE' ALTA VELOCITA'
HIGH SPEED RELAY
OS
CAM
RPR
CONTATTORE PATTINO RETRATTILE
RETIRING CAM CONTACTOR
INTERRUTTORE FINE CORSA CHIUSURA
DOOR CLOSE LIMIT
DC
DO
CD
DOC
DCC
CONTATTORE CHIUSURA PORTA
DOOR CLOSE CONTACTOR
CONTATTORE APERTURA PORTA
DOOR OPEN CONTACTOR
VEDI / SEE 3/D.3
COLLEGARE DIRETTAMENTE SE NON VIENE UTILIZZATO IL FINE CORSA APERTURA
CONNECT DIRECTLY IF DOOR OPEN LIMIT SWITCH IS NOT PRESENT
INTERR FINE CORSA APERTURA
DOOR OPEN LIMIT
+ 1/A.3
- 1/B.5
SAFETY MODULE "CS"
CIRCUITO SICUREZZA "CS"
S34
S33
S35
S22
S21
S12
S11
S31
14
13
24
23
A2
A1
SHEET 2/B.4
SHEET 3/B.4
0V
24V
DS
US
IZS
SMS Sistemi e Microsistemi s.r.l.
ELEMPU, MANOVRA A.P.B. IDRAULICO
ELEMPU, A.P.B. OPERATION, HYDRAULIC
Document Number
SQ.ELEMPU.UOLA1.150002
A3
Rev 03
07/06/2015
Sheet 2 of 4

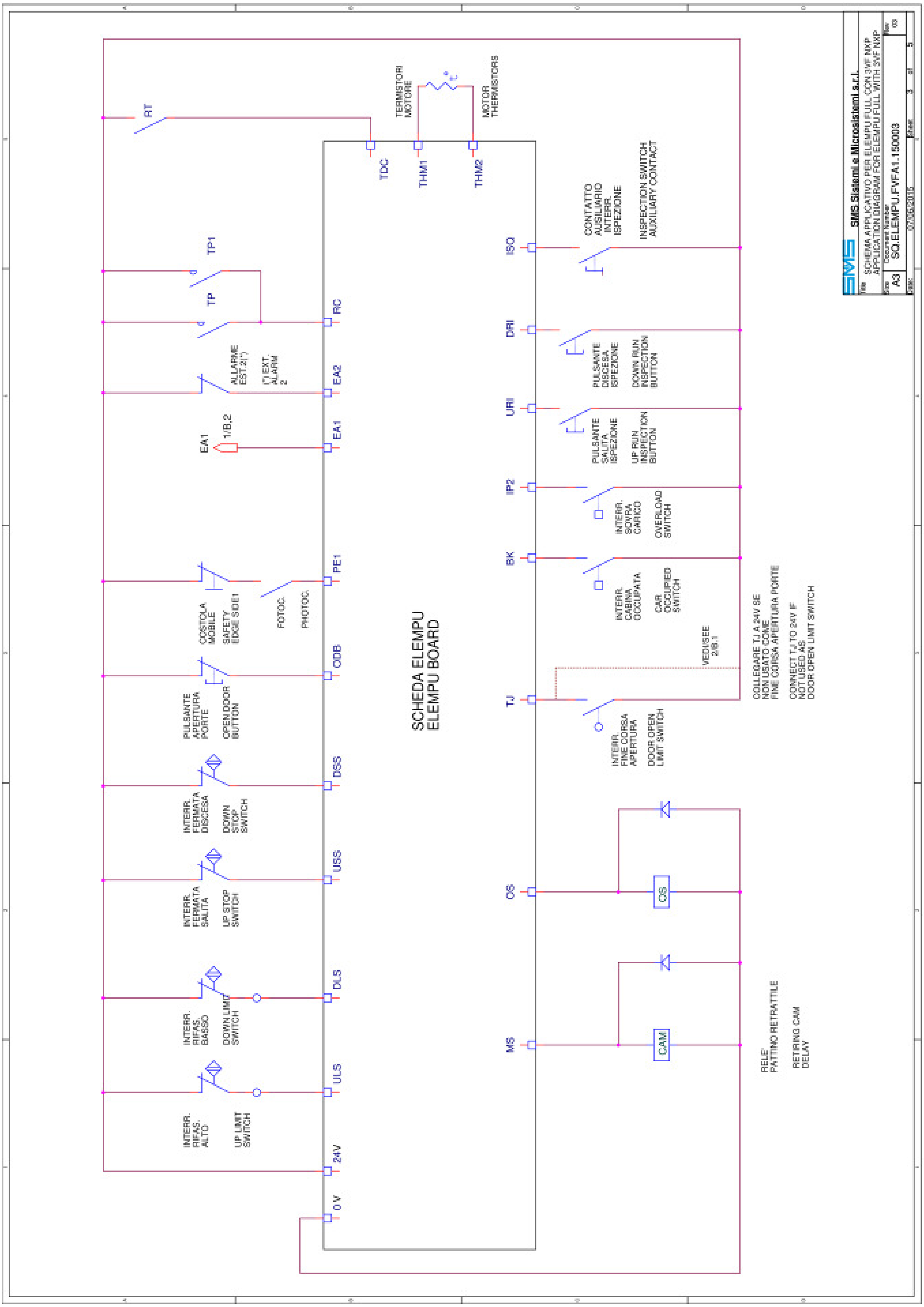


SCHEDA ELEMPU
ELEMPU BOARD
RELE' AUSILIARI IMPULSORI USS/DSS
AUXILIARY RELAYS TO USS/DSS SWITCHES
TERMISTORI MOTORE (*)
(*) MOTOR THERMISTORS
TH1
TH2
RC
EA2
EA1
REL
IP1
A31
DSS
USS
DLS
ULS
24 V
0 V
ISQ
DRI
URI
IP2
BK
TJ
OS
LEV
OP2
U
D
UD
ALLARME EST.2(*)
(*) EXT. ALARM 2
CONTROLLO FASI
PHASE CONTROL
1/B.1
23
24
CS
COSTOLA MOBILE
SAFETY EDGE SIDE
FOTOC.
PHOTOC.
PULSANTE APERTURA PORTE
OPEN DOOR BUTTON
INTERR. FERMATA DISCESA
DOWN STOP SWITCH
INTERR. FERMATA SALITA
UP STOP SWITCH
DS
US
INTERR. RIFAS. BASSO
DOWN LIMIT SWITCH
INTERR. RIFAS. ALTO
UP LIMIT SWITCH
CONTATTO AUSILIARIO INTERR. ISPEZIONE
INSPECTION SWITCH AUXILIARY CONTACT
PULSANTE DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
INTERR. SOVRACCARICO
OVERLOAD SWITCH
INTERR. CABINA OCCUPATA
CAR OCCUPIED SWITCH
VEDI/SEE 2/B.1
INTERR. FINE CORSA APERTURA
DOOR OPEN LIMIT SWITCH
COLLEGARE TJ A 24V SE NON USATO COME FINE CORSA APERTURA PORTE
CONNECT TJ TO 24V IF NOT USED AS DOOR OPEN LIMIT SWITCH
RELE' COMANDO RILIVELLAMENTO
RELEVELLING RELAY
RELE' PATTINO RETRATTILE
RETIRING CAM RELAY
CAM
SMS Sistemi e Microsistemi s.r.l.
Title
ELEMPU, MANOVRA A.P.B. IDRAULICO
ELEMPU, A.P.B. OPERATION, HYDRAULIC
Size A3
Document Number SQ.ELEMPU.UOLA1.150002
Rev 03
Date 07/06/2015
Sheet 3 of 4

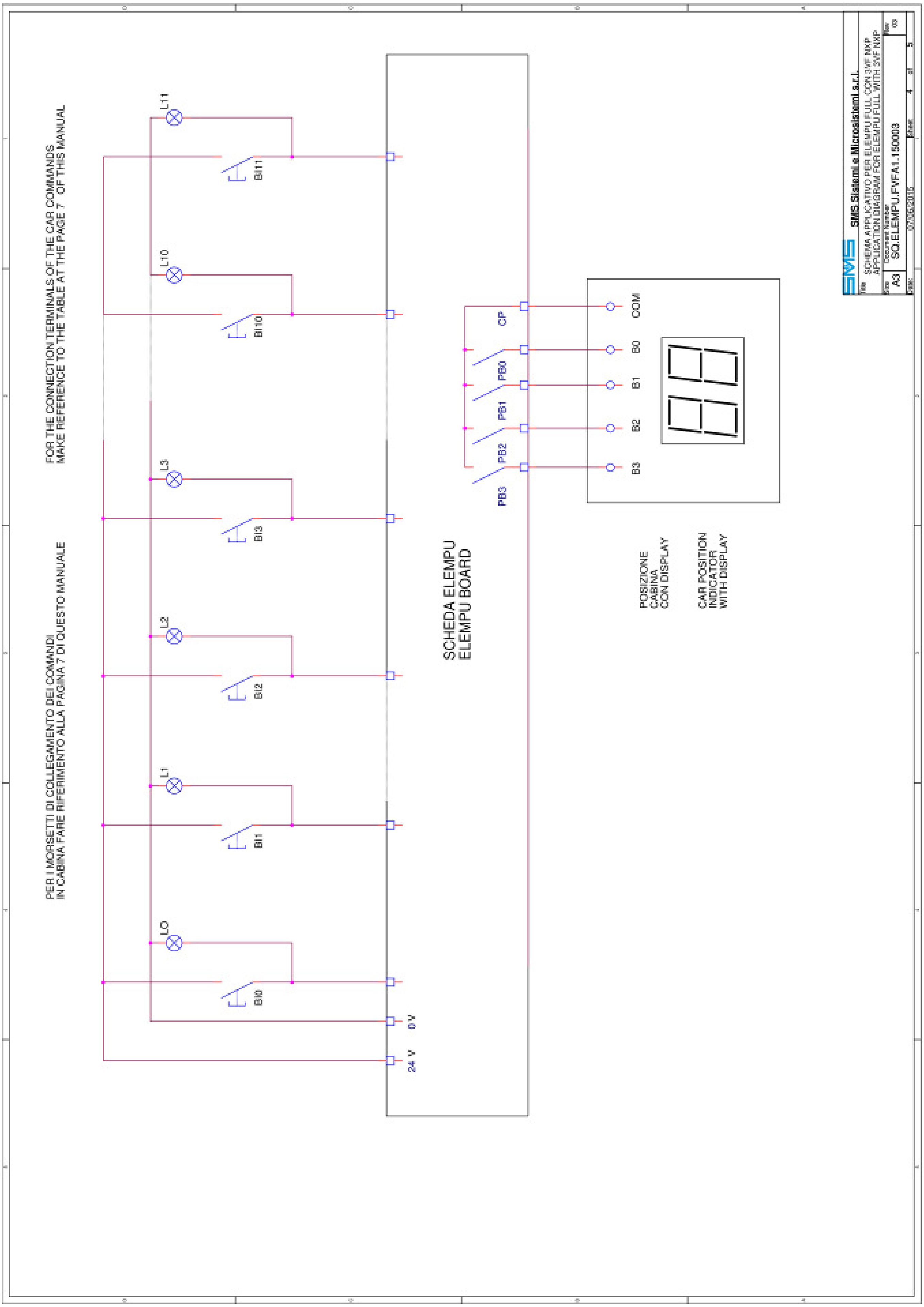
9.3 - CONTROL PANEL DIAGRAM EXAMPLE
FULL COLLECTIVE OPERATION – WITH VACON NXP VVVF DRIVE

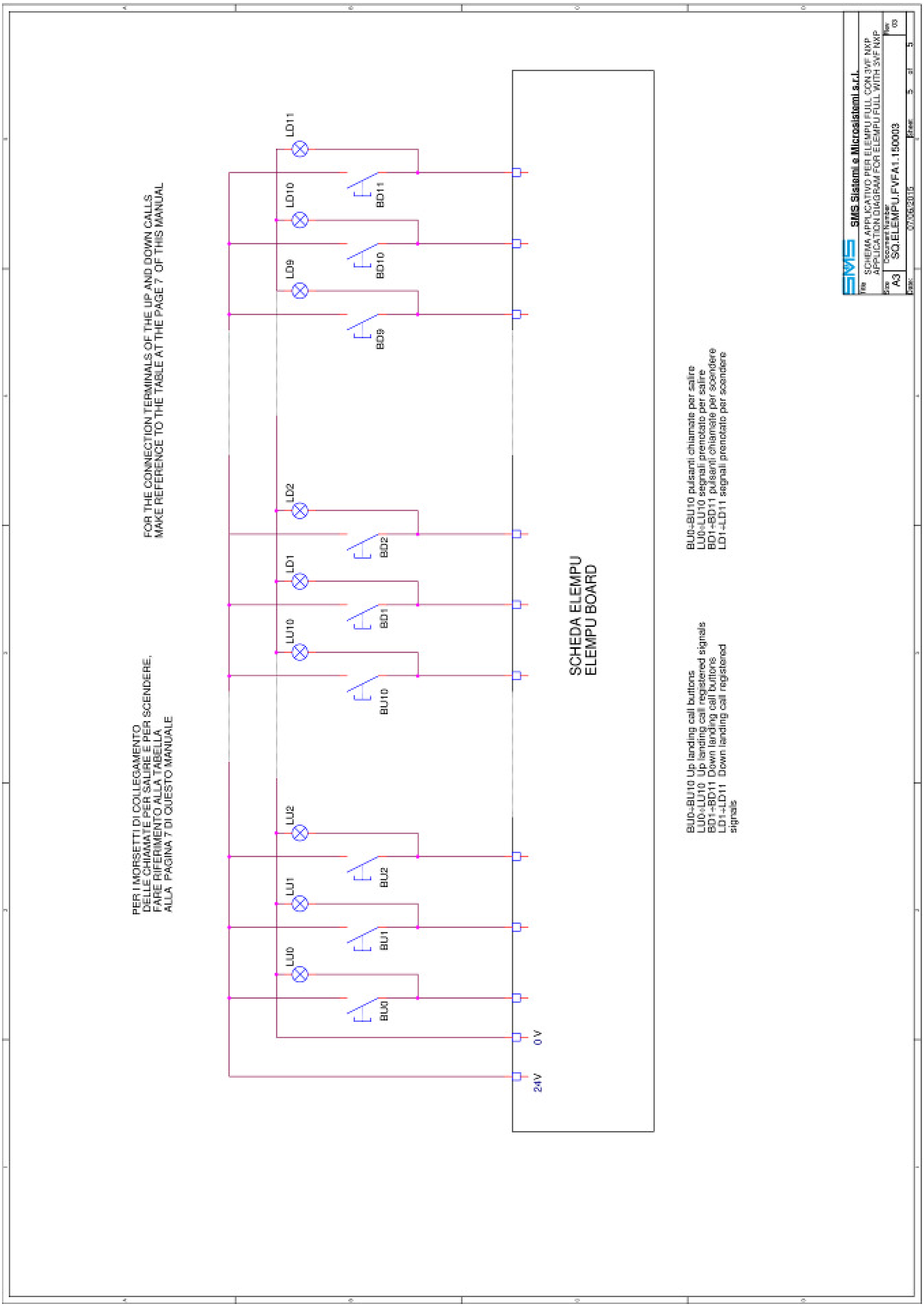



SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELEMPU FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELEMPU FULL WITH 3VF NXP
SQ.ELEMPU.FVFA1.150003
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A3
03
1/A.3
1/B.5
VALVOLA AUTOMATICA
AUTOMATIC FUSE
EXTRACORSA
OVERTRAVEL SWITCH
STOP FOSSA: LIM. VELOCITA', PARACADUTE...
PIT STOP SWITCH: SPEED GOVERNOR, SAFETY SWITCH...
TOP CAR STOP SWITCH
STOP TETTO
PULSANTI SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
PULSANTI DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
INTERRUTTORE ISPEZIONE
INSPECTION SWITCH
URI
DRI
ALT (EVENTUALE)
CAR STOP SWITCH (EVENTUAL)
PORTE CABINA
CAR DOOR SWITCHES
BLOCCHI ESTERNI
LANDING DOOR LOCKED SWITCHES
SC1
SC2
SC3
SC4
SC5
SCC
CA
AU
AD
TP
TP1
CONTATTORI MOTORE
MOTOR CONTACTORS
SCHEDA ELEMPU
ELEMPU BOARD
OS
CAM
RPR
CONTATTORE PATTINO RETRATTILE
RETIRING CAM CONTACTOR
DC
DO
CD
INTERRUTTORE FINE CORSA CHIUSURA
DOOR CLOSE LIMIT
DOC
DCC
CONTATTORE CHIUSURA PORTA
DOOR CLOSE CONTACTOR
VEDI / SEE 3/D.3
COLLEGARE DIRETTAMENTE SE NON VIENE UTILIZZATO IL FINE CORSA APERTURA
CONNECT DIRECTLY IF DOOR OPEN LIMIT SWITCH IS NOT PRESENT
CONTATTORE APERTURA PORTA
DOOR OPEN CONTACTOR
INTERR FINE CORSA APERTURA
DOOR OPEN LIMIT



SCHEDA ELEMPU
ELEMPU BOARD
RT
TDC
THM1
THM2
TERMISTORI MOTORE
MOTOR THERMISTORS
TP1
TP
RC
ALLARME EST.2(*)
(*) EXT. ALARM 2
EA2
EA1
1/B.2
COSTOLA MOBILE
SAFETY EDGE SIDE1
FOTOC.
PHOTOC.
PE1
PULSANTE APERTURA PORTE
OPEN DOOR BUTTON
ODB
INTERR. FERMATA DISCESA
DOWN STOP SWITCH
DSS
INTERR. FERMATA SALITA
UP STOP SWITCH
USS
INTERR. RIFAS. BASSO
DOWN LIMIT SWITCH
DLS
INTERR. RIFAS. ALTO
UP LIMIT SWITCH
ULS
24V
0 V
ISO
CONTATTO AUSILIARIO INTERR. ISPEZIONE
INSPECTION SWITCH AUXILIARY CONTACT
DRI
PULSANTE DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
URI
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
IP2
INTERR. SOVRA CARICO
OVERLOAD SWITCH
BK
INTERR. CABINA OCCUPATA
CAR OCCUPIED SWITCH
VEDI/SEE 2/B.1
TJ
INTERR. FINE CORSA APERTURA
DOOR OPEN LIMIT SWITCH
COLLEGARE TJ A 24V SE NON USATO COME FINE CORSA APERTURA PORTE
CONNECT TJ TO 24V IF NOT USED AS DOOR OPEN LIMIT SWITCH
OS
MS
CAM
RELE' PATTINO RETRATTILE
RETIRING CAM DELAY
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELEMPU FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELEMPU FULL WITH 3VF NXP
A3
SQ.ELEMPU.FVFA1.150003
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FOR THE CONNECTION TERMINALS OF THE CAR COMMANDS
MAKE REFERENCE TO THE TABLE AT THE PAGE 7 OF THIS MANUAL
PER I MORSETTI DI COLLEGAMENTO DEI COMMANDI
IN CABINA FARE RIFERIMENTO ALLA PAGINA 7 DI QUESTO MANUALE
L11
L10
L3
L2
L1
LO
BI11
BI10
BI3
BI2
BI1
BI0
0 V
24 V
SCHEDA ELEMPU
ELEMPU BOARD
CP
PB0
PB1
PB2
PB3
COM
B0
B1
B2
B3
POSIZIONE
CABINA
CON DISPLAY
CAR POSITION
INDICATOR
WITH DISPLAY
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELEMPU FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELEMPU FULL WITH 3VF NXP
A3
SQ.ELEMPU.FVFA1.150003
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5


FOR THE CONNECTION TERMINALS OF THE UP AND DOWN CALLS
MAKE REFERENCE TO THE TABLE AT THE PAGE 7 OF THIS MANUAL
PER I MORSETTI DI COLLEGAMENTO
DELLE CHIAMATE PER SALIRE E PER SCENDERE,
FARE RIFERIMENTO ALLA TABELLA
ALLA PAGINA 7 DI QUESTO MANUALE
LD11
LD10
LD9
BD11
BD10
BD9
LD2
LD1
LU10
BD2
BD1
BU10
LU2
LU1
LU0
BU2
BU1
BU0
0 V
24V
SCHEDA ELEMPU
ELEMPU BOARD
BU0÷BU10 pulsanti chiamate per salire
LU0÷LU10 segnali prenotato per salire
BD1÷BD11 pulsanti chiamate per scendere
LD1÷LD11 segnali prenotato per scendere
BU0÷BU10 Up landing call buttons
LU0÷LU10 Up landing call registered signals
BD1÷BD11 Down landing call buttons
LD1÷LD11 Down landing call registered signals
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELEMPU FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELEMPU FULL WITH 3VF NXP
A3
SQ.ELEMPU.FVFA1.150003
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ELEPLUS
Board

EXPANSION WITH SERIAL CONNECTION

(for CAR or CONTROL PANEL)



10 – ELEPLUS BOARD DIMENSIONS AND FASTENING

Dimensions: 100 x 200 mm

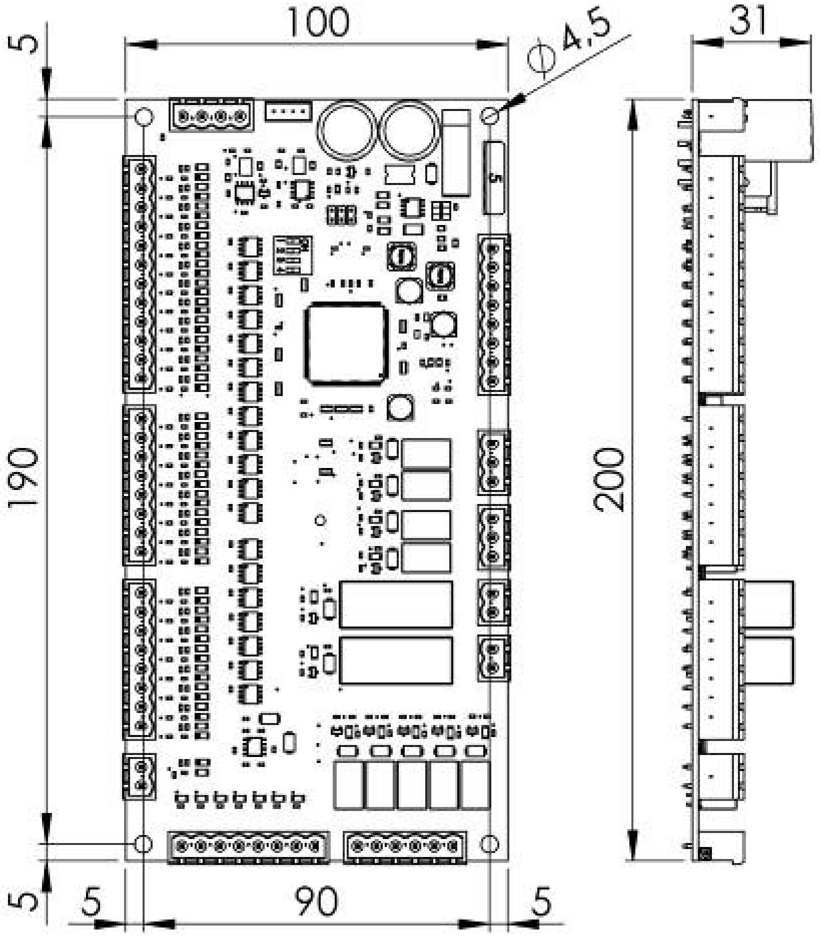


Fig. 11

11 – ELEPLUS BOARD ELECTRICAL SPECIFICATIONS

Board power supply: 18Vac +/- 10% (terminals 18V~ - 18V~ / M12), protected by a replaceable fuse 4A .

Inputs / Outputs Power Supply Output: 24Vdc (terminals 24X – 0V / M12)

IMPORTANT Do not power the board with voltage different than the specified one; moreover, **the negative pole of 24VDC voltage (terminals 0V / M13) must NOT be connected to GROUND**.

INPUTS

The status of each input is indicated by the relative GREEN LED.

NOTE: For the inputs from car control buttons, since they are common with the relative output, the LED is RED

N°28 Inputs 24Vdc (Terminal blocks M2 ÷ M4) for the signals coming from car control buttons, maintenance control box,car load switches, photocells, etc. (See detailed list in Chapter 14).
All the input circuits are protected against line noises and voltage surges.

N° 1 Input for thermistors, for motor thermal protection (terminals TH1 – TH2 / M5).
Motor thermistors should be directly connected to the board; when the protection is not active, the corresponding green LED is on.

OUTPUTS

The status of each output is displayed by the relative RED LED.

N° 2 Relay Outputs OA - OB:

Dry contacts are available in the terminal block of the above mentioned relays, which have the following features:

Nominal voltage:	250Vac
Rated load AC15:	400VA
Break power DC1:	110V 0.3 A

In this configuration of the ELEPLUS Board, they assume the following functions:
- OA = retiring cam control
- OB = car light control

N° 4 Relay Outputs for:
- Door opening / closing commands ENTRANCE 1 (Terminal Block M11)
- Door opening / closing commands ENTRANCE 1 (Terminal Block M10)

Dry contacts are available in the terminal block of the above mentioned relays, which have the following features:

Switching power:	0.5A/125Vac	1A/30Vdc
Max switching voltage (AC/DC):	125Vac/ 60Vdc	

The command commons (terminals CD1, CD2) are voltage free.

N° 5 Relay Output for:
- Control of Car Position signal in binary code (CB0 ÷ CB4 - Terminal Block M7))

Dry contacts are available in the terminal block of the above mentioned relays, which have the following features:

Switching power:	0.5A/125Vac	1A/30Vdc
Max switching voltage (AC/DC):	125Vac/ 60Vdc	

The common terminal of position signal (CCD) is voltage free.

N°12 Transistor Outputs for **REGISTERED COMMAND** signal (Terminal block M2).
Maximum current supplied by each output = **250mA**.
The output transistors are protected against short circuit.

N° 7 Transistor Outputs (Terminal block M6), for GONG signal, Next car leaving direction signals and other optional controls.
Maximum current supplied by each output = **250mA**.
The output transistors are protected against short circuit.
The outputs connected to terminal block M6 can be connected directly to external signals or relays, with **24VDC** coil.
The load must be connected between the corresponding terminal and **0V**, as indicated in the example in Fig. 12 for the Gng Signal (GNG).
Always connect a diode in parallel with the coil of any relay.

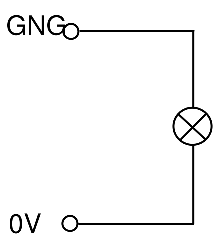


Fig. 12

N° 1 CAN BUS serial port for ELEMPU or other ELEPLUS Board connection

N° 1 RS485 serial port for service functions

N° 2 LED DIAGNOSTICS Signals:

LED A	**RED**	SLOW Flashing	= The microprocessor is working
LED B	**GREEN**	FAST Flashing	= The CAN comunication is ON

12 – ELEPLUS BOARD LAYOUT

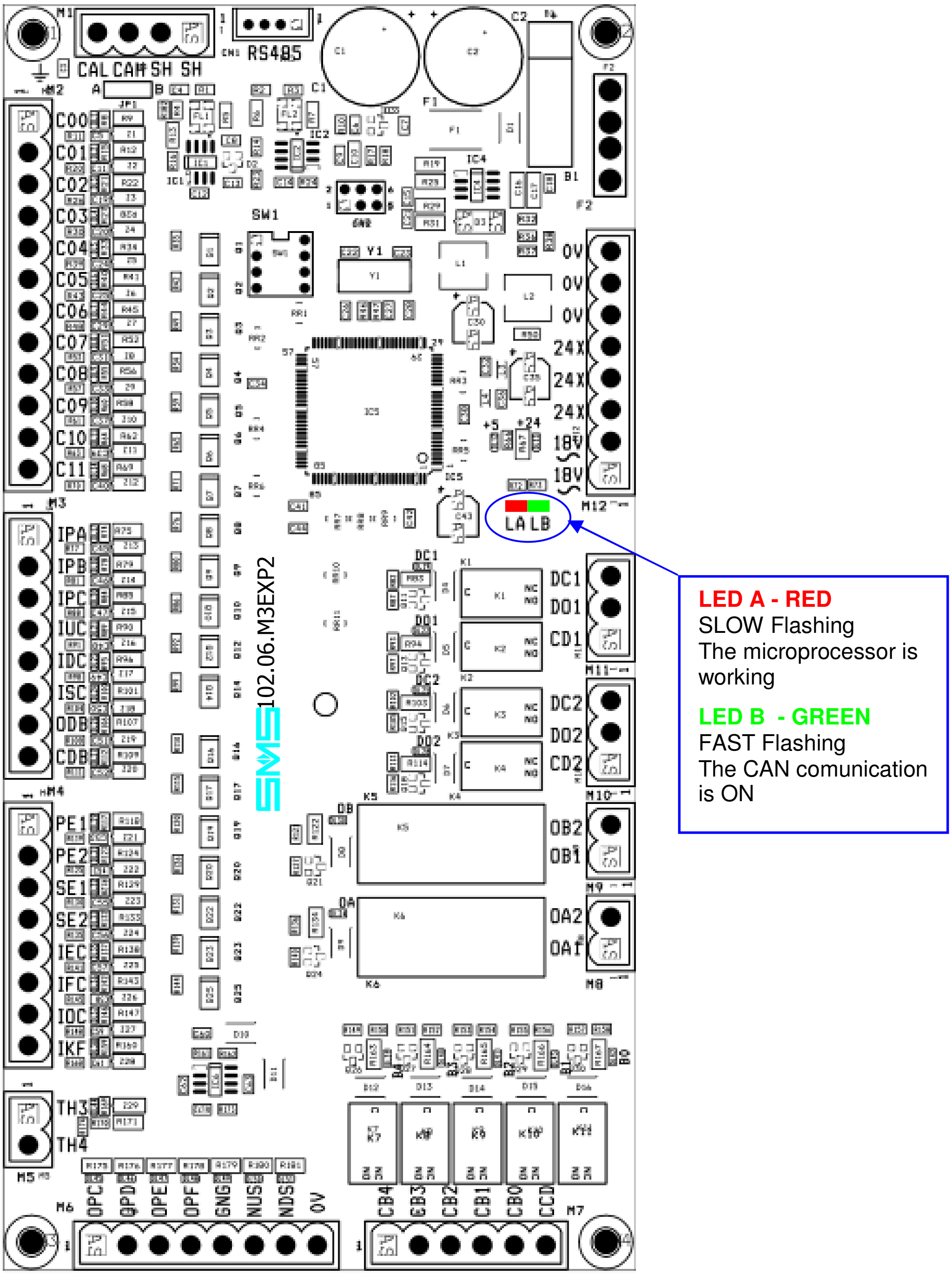


Fig. 13

CONNECTIONS

AND DIAGRAM EXAMPLES

FOR

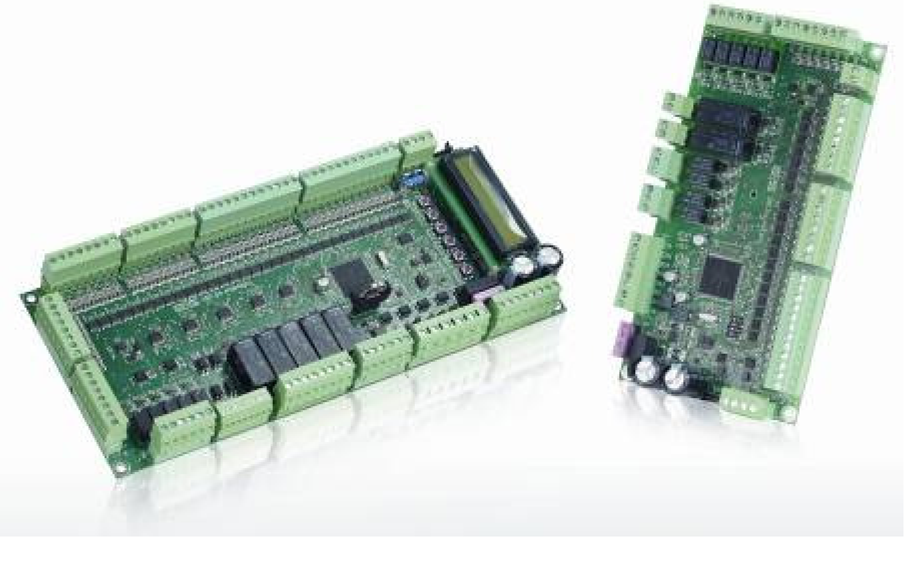
ELEMPU Board

+

ELEPLUS Board

Shaft connection: PARALLEL

Car Connection: SERIAL



13 – CONNECTIONS OF ELEMPU BOARD
When combined with the ELEPLUS BOARD

For ELEMPU application combined with ONE or MORE ELEPLUS Board
SET F51 = YES

INPUTS / OUTPUTS

TERMINAL BLOCKS M2 – M3

<table>
<tr><th rowspan="2">LABEL</th><th colspan="4">OPERATION:</th></tr>
<tr><th colspan="2">AUTOMATIC PUSH BUTTON (A.P.B.)</th><th>↓DOWN COLLECTIVE</th><th>FULL COLLECTIVE</th></tr>
<tr><td>U00</td><td colspan="2">Landing call Floor 0</td><td>Up landing call Floor 0</td><td>Up landing call Floor 0</td></tr>
<tr><td>U01</td><td colspan="2">Landing call Floor 1</td><td>Down landing call Floor 1</td><td>Up landing call Floor 1</td></tr>
<tr><td>U02</td><td colspan="2">Landing call Floor 2</td><td>Down landing call Floor 2</td><td>Up landing call Floor 2</td></tr>
<tr><td>U03</td><td colspan="2">Landing call Floor 3</td><td>Down landing call Floor 3</td><td>Up landing call Floor 3</td></tr>
<tr><td>U04</td><td colspan="2">Landing call Floor 4</td><td>Down landing call Floor 4</td><td>Up landing call Floor 4</td></tr>
<tr><td>U05</td><td colspan="2">Landing call Floor 5</td><td>Down landing call Floor 5</td><td>Up landing call Floor 5</td></tr>
<tr><td>U06</td><td colspan="2">Landing call Floor 6</td><td>Down landing call Floor 6</td><td>Up landing call Floor 6</td></tr>
<tr><td>U07</td><td colspan="2">Landing call Floor 7</td><td>Down landing call Floor 7</td><td>Up landing call Floor 7</td></tr>
<tr><td>U08</td><td colspan="2">Landing call Floor 8</td><td>Down landing call Floor 8</td><td>Up landing call Floor 8</td></tr>
<tr><td>U09</td><td colspan="2">Landing call Floor 9</td><td>Down landing call Floor 9</td><td>Up landing call Floor 9</td></tr>
<tr><td>U10</td><td colspan="2">Landing call Floor 10</td><td>Down landing call Floor 10</td><td>Up landing call Floor 10</td></tr>
<tr><td>U11</td><td colspan="2">Landing call Floor 11</td><td>Down landing call Floor 11</td><td>---</td></tr>
<tr><td>D00</td><td>Car at Floor 0</td><td rowspan="12">DECIMAL CAR POSITION Signal (one output per floor)</td><td rowspan="12">Possible use for Down Landing Calls up to 24 stps with N°2 ELEPLUS Boards (see Chapter 16)</td><td>---</td></tr>
<tr><td>D01</td><td>Car at Floor 1</td><td>Down landing call Floor 1</td></tr>
<tr><td>D02</td><td>Car at Floor 2</td><td>Down landing call Floor 2</td></tr>
<tr><td>D03</td><td>Car at Floor 3</td><td>Down landing call Floor 3</td></tr>
<tr><td>D04</td><td>Car at Floor 4</td><td>Down landing call Floor 4</td></tr>
<tr><td>D05</td><td>Car at Floor 5</td><td>Down landing call Floor 5</td></tr>
<tr><td>D06</td><td>Car at Floor 6</td><td>Down landing call Floor 6</td></tr>
<tr><td>D07</td><td>Car at Floor 7</td><td>Down landing call Floor 7</td></tr>
<tr><td>D08</td><td>Car at Floor 8</td><td>Down landing call Floor 8</td></tr>
<tr><td>D09</td><td>Car at Floor 9</td><td>Down landing call Floor 9</td></tr>
<tr><td>D10</td><td>Car at Floor 10</td><td>Down landing call Floor 10</td></tr>
<tr><td>D11</td><td>Car at Floor 11</td><td>Down landing call Floor 11</td></tr>
</table>

Table 3 – Configuration of Landing calls for ELEMPU combined with ELEPLUS Board

To each LANDING CALL is linked the relative signal.:

- in case of AUTOMATIC PUSH BUTTON (A.P.B.) operation, all the signals on terminals U00 ÷ U11 contemporarily light on when the car is engaged, so they can be used to control the “OCCUPIED” signal at landings.
- in case of COLLECTIVE operation, each output controls the “REGISTERED” signal of the connected push-button.

These signals must be connected to the same terminals provided for the buttons, as shown in Figure 14 (only one wire for the connection of button/lamp to the board):

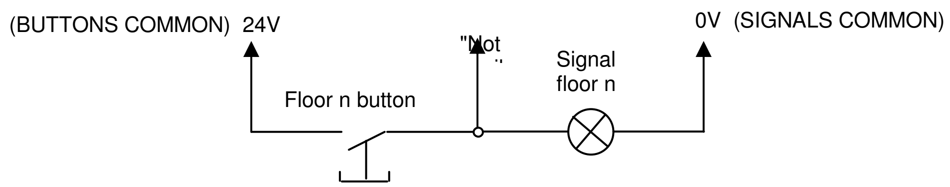


Figura 14

CAR POSITION signals in decimal code are supplied by 24Vdc (Max load = 250mA) with short-circuit protection.
In case you use a display, this MUST be of NEGATIVE COMMON (common cathode type).

INPUTS 24Vdc

TERMINAL BLOCKS M4 - M5 - M6

All INPUTS connected to the above terminal blocks are contacts or switches supplied by 24Vdc. Therefore, they must be connected between the common 24V and the corresponding terminal, <u>except for the EKF and THERMISTORS inputs described in the follwing.</u>

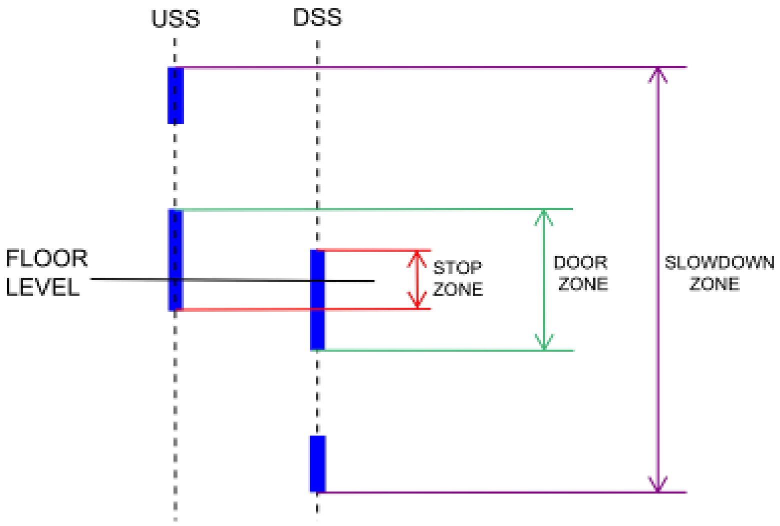
<table>
<tr><th>LABEL
M4</th><th>DESCRIPTION</th></tr>
<tr><td>USS
DSS</td><td>UP STOP SWITCH (DOWNWARD SLOWDOWN)
DOWN STOP SWITCH (UPWARD SLOWDOWN)


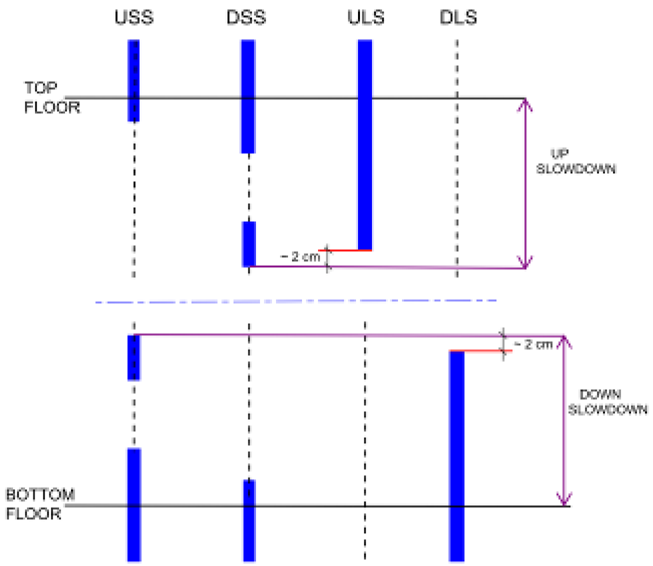
Fig. 15
The contacts of USS and DSS can be of NO or NC type, with appropriate programming.
If necessary, for example due to the speed of the system or to the distance between the floors, the magnets that control the slowdown can "cross", i.e. the magnet, which controls the slowdown to the next floor may be positioned immediately after the magnets of floor zone (stop/door zone).
No programming is required for the board. The software adjusts automatically.
It is however required to provide a distance of a few centimetres between the floor zone magnets and the slow down on, to allow the correct reading of the input (this distance depends on the system speed); usually 5 cm are sufficient, and therefore the minimum distance between floors allowed is equal to the slowdown space + door unlock space + 5 cm.</td></tr>
<tr><td>ULS
DLS</td><td>TOP FLOOR LIMIT SWITCH
BOTTOM FLOOR LIMIT SWITCH
The switches ULS and DLS must be of type NC and driven at end floors by a magnet with a length equal to slowdown distance minus 2 cm, as shown in the figure below.


Fig. 16</td></tr>
</table>

LABEL *M4*	DESCRIPTION
ISQ	CONTACT OF THE INSPECTION BOX IN THE CONTROL PANEL: It must be CLOSED with the system in NORMAL service, and OPEN in INSPECTION state. In the SAFETY CHAIN must be provided contacts to disable the INSPECTION operation, if activated by different inspection boxes.
URI	INSPECTION UP BUTTON IN THE CONTROL PANEL
DRI	INSPECTION DOWN BUTTON IN THE CONTROL PANEL
IP1	OPTIONAL INPUT 1: - to be defined

LABEL *M5*	DESCRIPTION
IP2	OPTIONAL INPUT 2: - to be defined
TDC	CONTACTOR DROP-OUT DELAY: Active input for VVVF drive only. Connect the output of the VVVF dedicated to the control of the contactors. If not connected, the drop-out of the contactors in VVVF drive mode is controlled with a delay with respect to the stop command (set in parameter F17).
RC	RUN CONTACTORS CONTROL: Connect to the auxiliary contacts of contactors that control the motor, where an eventual "sticking" could bring to a dangerous operation. It is possible to program if the input must be active during RUN (contacts N. A. in parallel) or active with car STOPPED (contacts N.C. in series).
ROP	EMERGENCY OPERATION ACTIVATION: See description of operation in Chapter 3.7.
REL	RELEVELING ENABLE CONTACT: Connect to an auxiliary contact of the SAFETY CIRCUIT which enables releveling with open doors and that provides the door contact by-pass - see Chapter 3.5 .
TJ	NOT USED in this configuration of ELEMPU
BK	Input prepared to later use as BRAKE COMMAND INPUT for AMENDMENT 3 operation.
EA1	EXTERNAL ALARM 1: The opening of this input causes the OUT OF SERVICE with immediate stop of the car. It can be connected, for example at the contact of the MAINS PHASE CONTROL device or at FAULT contact of the VVVF. When the input closes again after an opening, the lift automatically returns to service with a reset operation. Connect a 24V if not used.

LABEL *M6*	DESCRIPTION
EA2	EXTERNAL ALARM 2: The opening of this input causes the car to stop at the end of the current travel. It can be connected for example to the contact of the oil thermostat. Connect to 24V if not used.
VIC	V.I.P. CALL - See description of operation in Chapter 3.8
FO	CONTACT FOR ENABLING FIRE-FIGHTERS OPERATION FLOOR 1: - See description of operation in Chapter 3.9 The input must be in ON status with firefighter operation. NOT ACTIVE (N.C. contact)
EKF	KEY SWITCH EXTERNAL TO THE CAR: To activate the PHASE 2 of the fire-fighter operation as per EN81-72 – See Chapter 3.9 Connect the key between the EKF terminal and the OS terminal (M7). The input must be in OFF state if the PHASE 2 is not active (N.O. contact).
A31 **A32**	Inputs prepared to later use as BRAKE MICRO-SWITCH INPUTS for AMENDMENT 3 operation.
TH1 **TH2**	MOTOR THERMISTORS: Make a jumper between TH1 and TH2 if not used.

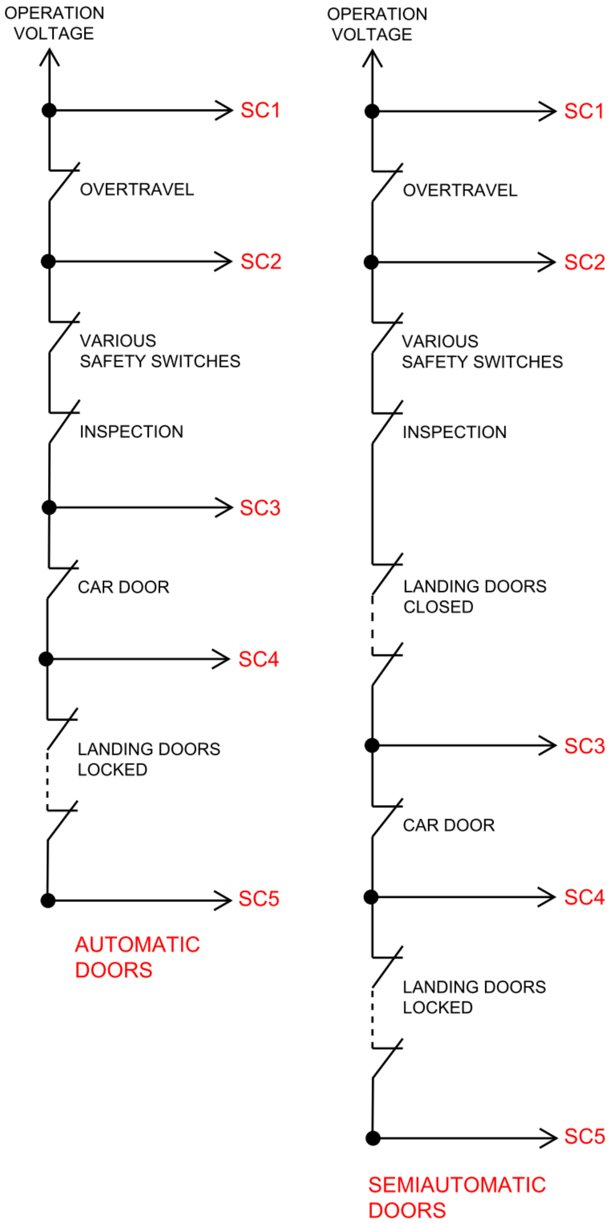
SAFETY CHAIN INPUTS

TERMINAL BLOCK M12

Optoisolated inputs for the control of the state of safety circuits.

LABEL	DESCRIPTION
SCC	VOLTAGE REFERENCE OF SAFETY CIRCUITS: GROUNDED on the control panel.
SC1	SAFETY CHAIN BEGINNING: Downstream of the OPERATIN AUTOMATIC VALVE
SC2	1st SECTION OF SAFETY CHAIN: Downstream of the OVERTRAVEL switch, that must be the 1st of the series
SC3	2nd SECTION OF SAFETY CHAIN: Downstream of VARIOUS SAFETY SWITCHES (STOP SWITCH IN THE PIT, OVERSPEED GOVERNOR, OVERSPEED GOVERNOR TENSION DEVICE, SAFETY GEAR, etc.), of the NORMAL SERVICE / INSPECTION SWITCH, of the LANDING DOOR CLOSED CONTACTS (for SEMIAUTOMATIC doors only)
SC4	3rd SECTION OF SAFETY CHAIN: Downstream of the CAR DOOR CONTACT
SC5	4th SECTION OF SAFETY CHAIN: Downstream of the LANDING DOOR LOCKED CONTACTS

EXAMPLES OF SAFETY CHAIN CONNECTION FOR DIFFERENT DOOR TYPES



IMPORTANT!

In the hydraulic systems with semi-automatic doors, to enable releveling with doors open, the safety chain SC3 shall not be interrupted by the landing door closed switches.

SC3 must be connected upstream, but to prevent from the automatic car doors closing with the landing doors open, it is required to connect a relay after the previous contacts, connecting a dedicated NO contact in series to the photocell input (IP1).

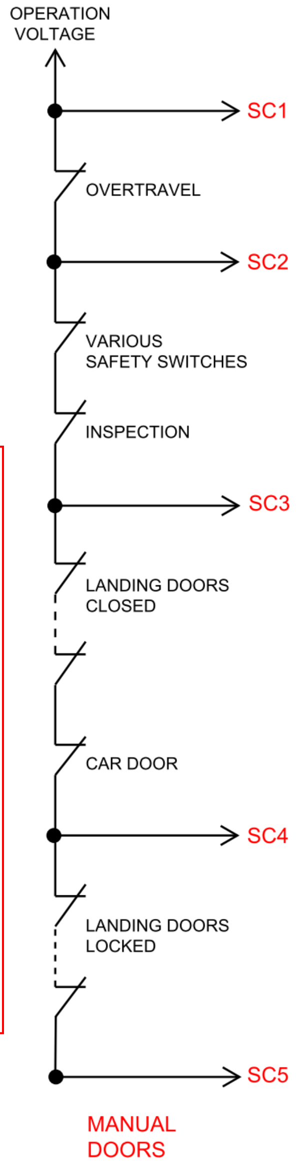


Fig. 17

RELAY OUTPUTS

TERMINAL BLOCK M10

Direction and speed controls

LABEL	DESCRIPTION
CS **LS** **HS**	COMMON HIGH/LOW SPEED CONTROLS LOW SPEED CONTROL HIGH SPEED CONTROL
SCC	Connect the VOLTAGE REFERENCE OF SAFETY CHAIN (connected to GROUND on the control panel) to ensure the insulation between the circuits.
CA **AD** **AU**	COMMON UP/DOWN CONTROLS DOWN CONTROL UP CONTROL

TERMINAL BLOCK M11

Automatic doors and "Occupied" controls

LABEL	DESCRIPTION
CD **DC** **DO**	COMMON DOOR OPENING/CLOSING CONTROLS DOOR CLOSING CONTROL DOOR OPENING CONTROL
OC1 **OC2**	N.O. contact of EC relay Assumes a different function based on the type of operation, such as - OCCUPIED SIGNAL in AUTOMATIC PUSH BUTTON (A.P.B.) operation connect an external relay with N.C. contact to disable calls from the floors – see the diagram example in Chapter 8.1. - CAR LIGHT CONTROL in COLLECTIVE operation

TERMINAL BLOCK M8

Commands for CAR POSITION Signal in BINARY code AT LANDINGS

LABEL	DESCRIPTION
CP	CAR POSITION SIGNALS POWER SUPPLY: The CP terminal is voltage free, and must be connected to the supply voltage required by the display.
PB0	BIT0 CAR POSITION DECODING
PB1	BIT1 CAR POSITION DECODING
PB2	BIT2 CAR POSITION DECODING
PB3	BIT3 CAR POSITION DECODING
PB4	BIT4 CAR POSITION DECODING

OUTPUTS WITH PHOTOCOUPLER

TERMINAL BLOCK M9

Commands for VVVF DRIVE

LABEL	DESCRIPTION
CV	VVVF COMMAND COMMON
EMV	EMERGENCY
LSV	LOW SPEED
MSV	INSPECTION SPEED
HSV	HIGH SPEED
ADV	DOWN RUN
AUV	UP RUN

TRANSISTOR OUTPUTS 24Vdc

TERMINAL BLOCK M7

LABEL	DESCRIPTION
OS	OUT-OF-SERVICE: ACTIVE output in normal operation, NOT ACTIVE in out-of-service - It is recommended to control an external relay which has the N.O. contact upstream of the safety chain.
SBY	STAND-BY: Allows to manage the system standby. This output may be used to control a contactor which deactivates the three-phase power supply for the entire control panel and opens the SC1 input at the beginning of the safety chain (in this case the car position information is not lost). - See description of operation in Chapter 15.2
EME	LIFT SYSTEM IN EMERGENCY OPERATION
LEV	LIFT SYSTEM RELEVELING: Control an external relay, where NO contact is placed in series with the contact of the SAFETY CIRCUIT which provides the by-pass of the contacts of the doors - see functional description and example of diagram to Chapter 3.5
EA3	Output prepared for later use as ALARM in AMENDMENT 3 operation.
OP1	OPTIONAL OUTPUT 1: - to be defined
OP2	OPTIONAL OUTPUT 2: Currently it assumes the function: -**CAM** – RETIRING CAM control

CAN BUS SERIAL CONNECTION

TERMINAL BLOCK M1

LABEL	DESCRIPTION
CAL **CAH**	Connect to the respective terminals CAL / CAH on the Terminal Block M1 in the ELEPLUS Board through a SHIELDED CABLE.
⏚ ⏚	Connect to the SHIELD of the above mentioned cable. In addition, connect the EARTH on the upper left fastening screw (near to CN1).

POWER SUPPLY

TERMINAL BLOCK M13

LABEL	DESCRIPTION
24E	AUXILIARY POWER SUPPLY (not used)
0V **24V**	24Vdc OUTPUT SUPPLY FOR SWITCHES – PUSH-BUTTONS – RELAYS – SIGNALS etc. ⚠ **Do not connect external supply to these terminals**
18V~ **18V~**	18Vac INPUT POWER SUPPLY FOR THE BOARD, from external INSULATION TRANSFORMER

14 – CONNECTIONS OF ELEPLUS BOARD
- CAR BOARD

INPUTS / OUTPUTS

TERMINAL BLOCK M2

LABEL	DESCRIPTION
C00	Car control Floor 0
C01	Car control Floor 1
C02	Car control Floor 2
C03	Car control Floor 3
C04	Car control Floor 4
C05	Car control Floor 5
C06	Car control Floor 6
C07	Car control Floor 7
C08	Car control Floor 8
C09	Car control Floor 9
C10	Car control Floor 10
C11	Car control Floor 11

Table 4 – Configuration of Car controls in ELEPLUS Board

To each CAR CONTROL is linked the relative REGISTERED signal.
These signals must be connected to the same terminals provided for the buttons, as shown in Figure 7 (only one wire for the connection of button/lamp to the board):

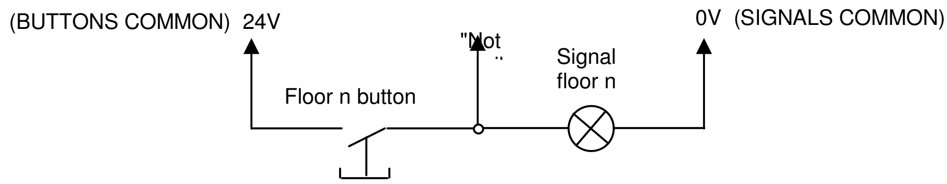


Fig. 18

INPUTS 24Vdc

TERMINAL BLOCKS M3 - M4

All INPUTS connected to the above terminal blocks are contacts or switches supplied by 24Vdc, so they must be connected between the common 24V and the corresponding terminal.

LABEL *M3*	DESCRIPTION
IPA	OPTIONAL INPUT A: Currently it assumes the function: CONTACT FOR ENABLING FIRE-FIGHTERS OPERATION FLOOR 2 - See description of operation in Chapter 3.9 The status of the input must be ON with firefighter operation. NOT ACTIVE (N.C. contact)
IPB	FULL CAR (load > 80% loading capacity): - In COLLECTIVE Operation, the car starts only serves the car calls and ignores the landing calls, that remain stored in order to be served at FC opening.
IPC	OPTIONAL INPUT C: Currently it assumes the function: - **ODI** - DOOR OPENING IN INSPECTION MODE (N.O. contact)
IUC	INSPECTION UP BUTTON ON THE CAR ROOF
IDC	INSPECTION DOWN BUTTON ON THE CAR ROOF
ISC	CONTACT OF THE INSPECTION BOX ON THE CAR ROOF: It must be CLOSED with the system in NORMAL service, and OPEN in INSPECTION state.
ODB	DOOR OPENING BUTTON: Contact normally closed, the action on the button controls the opening of the doors - connect to 24V if not used.
CDB	DOOR QUICK CLOSING BUTTON: Enabled for COLLECTIVE operation only

LABEL *M4*	DESCRIPTION
PE1	PHOTOCELL CONTACT and SAFETY EDGE SIDE 1: It must be CLOSED with beam free, and OPEN with beam interrupted
PE2	PHOTOCELL CONTACT and SAFETY EDGE SIDE 2: It must be CLOSED with beam free, and OPEN with beam interrupted
SE1	DOOR OPEN LIMIT SWITCH SIDE 1 (**DOL1**) Connect to 24V if not used – see example of drawing at pages 63-65.
SE2	DOOR OPEN LIMIT SWITCH SIDE 2 (**DOL2**) Connect to 24V if not used – see example of drawing at pages 63-65.
IEC	OCCUPIED CAR (load ≥ 1 person): - In A.P.B. Operation: if CLOSED, , it maintains the "OCCUPIED" output active. - In COLLECTIVE Operation: if it goes ON, when it later goes OFF all the car controls are deleted.
IFC	NOT USED – DO NOT CONNECT
IOC	CAR OVERLOAD (load > 110% loading capacity)
IKF	KEY SWITCH INSIDE THE CAR: To activate the PHASE 2 of the fire-fighters operation according to EN81-72 - See description of operation in Chapter 3.9 The input must be in OFF state if the PHASE 2 is not active (N.O. contact).

DOOR MOTOR THERMISTOR INPUT

TERMINAL BLOCK M5

LABEL	DESCRIPTION
TH3 **TH4**	DOOR MOTOR THERMISTORS Make a jumper between TH3 and TH4 if not used.

RELAY OUTPUTS

TERMINAL BLOCKS M8 – M9

LABEL *M8*	DESCRIPTION
OA1 **OA2**	OPTIONAL RELAY A (N.O. contact) Currently it assumes the function: **CAM** – RETIRING CAM control

LABEL *M9*	DESCRIPTION
OB1 **OB2**	OPTIONAL RELAY B (N.O. contact) Currently it assumes the function: **LC** – CAR LIGHT / FAN control

TERMINAL BLOCKS M10 – M11

Automatic door controls

LABEL *M11*	DESCRIPTION
CD1 **DC1** **DO1**	COMMON DOOR OPENING/CLOSING CONTROLS SIDE 1 DOOR CLOSING CONTROL SIDE 1 DOOR OPENING CONTROL SIDE 1

LABEL *M10*	DESCRIPTION
CD2	COMMON DOOR OPENING/CLOSING CONTROLS SIDE 2
DC2	DOOR CLOSING CONTROL SIDE 2
DO2	DOOR OPENING CONTROL SIDE 2

TERMINAL BLOCK M7

Commands for CAR POSITION Signal in BINARY code IN THE CAR

LABEL	DESCRIPTION
CCD	CAR POSITION SIGNALS POWER SUPPLY: The CCD terminal is voltage free, and must be connected to the supply voltage required by the display.
CB0	BIT0 CAR POSITION DECODING
CB1	BIT1 CAR POSITION DECODING
CB2	BIT2 CAR POSITION DECODING
CB3	BIT3 CAR POSITION DECODING
CB4	BIT4 CAR POSITION DECODING

TRANSISTOR OUTPUTS 24Vdc

TERMINAL BLOCK M6

LABEL	DESCRIPTION
OPC	OPTIONAL OUTPUT C - to be defined
OPD	OPTIONAL OUTPUT D - to be defined
OPE	OPTIONAL OUTPUT E - to be defined
OPF	OPTIONAL OUTPUT F Currently it assumes the function: **OCO** – CAR OVERLOAD acoustic / lighting signal control
GNG	CAR COMING acoustic signal (GONG)
NUS	DIRECTION UP (A.P.B. operation) /NEXT LEAVING UP (COLLECTIVE operation) Signal
NDS	DIRECTION DOWN (A.P.B. operation) /NEXT LEAVING DOWN (COLLECTIVE operation) Signal

CAN BUS SERIAL CONNECTION

TERMINAL BLOCK M1

LABEL	DESCRIPTION
CAL **CAH**	Connect to the respective terminals CAL / CAH on the Terminal Block M1 in the ELEMPU Board through a SHIELDED CABLE.
SH **SH**	Connect to the SHIELD of the above mentioned cable. In addition, connect the EARTH on the upper left fastening screw (near to M1).

POWER SUPPLY

TERMINAL BLOCK M12

LABEL	DESCRIPTION
24X **0V**	24Vdc OUTPUT SUPPLY FOR SWITCHES – PUSH-BUTTONS – RELAYS – SIGNALS etc. ⚠ **Do not connect external supply to these terminals.**
24E (18V~) **0E (18V~)**	18Vac INPUT POWER SUPPLY FOR THE BOARD, from external INSULATION TRANSFORMER

15 – AVAILABLE OPERATIONS WITH ELEMPU + ELEPLUS BOARDS (Not described at Chapter 3)

15.1 - STAND-BY FOR ENERGY SAVING

It allows to manage the system standby, which is activated setting Function F49 to a value different from 0: this is the time the board waits before going in the stand-by phase.

The SBY output is active (ON) during operation.

When the time set expires, in absence of calls, with the car still at floor and not in particular situations such as INSPECTION, EMERGENCY, FIREFIGHTERS OPERATION..., the SBY output is deactivated (OFF).

This output may be used to control a contactor which deactivates the power supply for the auxiliary circuits of the control panel and opens the SC1 input at the beginning of the safety chain, so that the board, even though the operation is disabled, the position of the car is not lost. If any landing or car call push button is pressed, the SBY output is immediately re-activated, returning the board to normal operating conditions.

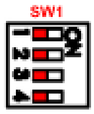
15.2 - DOUBLE CAR ENTRANCE WITH SELECTIVE OPENING (available in later software rele)

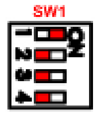
15.3 - CARS COMBINED IN DUPLEX – TRIPLEX (available in later software release

15.4 - AMENDMENT 3 (available in later software release)

16 – CONNECTION OF LANDING CALLS AND CAR CONTROLS FOR LIFT SYSTEMS WITH COLLECTIVE OPERATION AND > 12 STOP NUMBER

16.1 - DOWN COLLECTIVE UP TO 24 STOPS
N°1 ELEMPU Board + N°2 ELEPLUS Boards

ELEMPU Board **ELEPLUS Board N°0** 

ELEPLUS Board N°1 

LABEL	DESCRIPTION	LABEL	DESCRIPTION	LABEL	DESCRIPTION
U00	Up landing call Floor 0	**C00**	Car control Floor 0	**C00**	Car control Floor 12
U01	Down landing call Floor 1	**C01**	Car control Floor 1	**C01**	Car control Floor 13
U02	Down landing call Floor 2	**C02**	Car control Floor 2	**C02**	Car control Floor 14
U03	Down landing call Floor 3	**C03**	Car control Floor 3	**C03**	Car control Floor 15
U04	Down landing call Floor 4	**C04**	Car control Floor 4	**C04**	Car control Floor 16
U05	Down landing call Floor 5	**C05**	Car control Floor 5	**C05**	Car control Floor 17
U06	Down landing call Floor 6	**C06**	Car control Floor 6	**C06**	Car control Floor 18
U07	Down landing call Floor 7	**C07**	Car control Floor 7	**C07**	Car control Floor 19
U08	Down landing call Floor 8	**C08**	Car control Floor 8	**C08**	Car control Floor 20
U09	Down landing call Floor 9	**C09**	Car control Floor 9	**C09**	Car control Floor 21
U10	Down landing call Floor 10	**C10**	Car control Floor 10	**C10**	Car control Floor 22
U11	Down landing call Floor 11	**C11**	Car control Floor 11	**C11**	Car control Floor 23
D00	Down landing call Floor 12				
D01	Down landing call Floor 13				
D02	Down landing call Floor 14				
D03	Down landing call Floor 15				
D04	Down landing call Floor 16				
D05	Down landing call Floor 17				
D06	Down landing call Floor 18				
D07	Down landing call Floor 19				
D08	Down landing call Floor 20				
D09	Down landing call Floor 21				
D10	Down landing call Floor 22				
D11	Down landing call Floor 23				

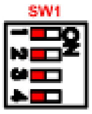
Table 5 – Configuration of Landing calls and Car controls - Down Collective 24 Stops

16.2 - FULL COLLECTIVE UP TO 18 STOPS
N°1 ELEMPU Board + N°3 ELEPLUS Boards

ELEMPU Board

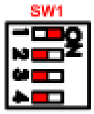
LABEL	DESCRIPTION
U00	Up landing call Floor 0
U01	Up landing call Floor 1
U02	Up landing call Floor 2
U03	Up landing call Floor 3
U04	Up landing call Floor 4
U05	Up landing call Floor 5
U06	Up landing call Floor 6
U07	Up landing call Floor 7
U08	Up landing call Floor 8
U09	Up landing call Floor 9
U10	Up landing call Floor 10
U11	Up landing call Floor 11
D00	
D01	Down landing call Floor 1
D02	Down landing call Floor 2
D03	Down landing call Floor 3
D04	Down landing call Floor 4
D05	Down landing call Floor 5
D06	Down landing call Floor 6
D07	Down landing call Floor 7
D08	Down landing call Floor 8
D09	Down landing call Floor 9
D10	Down landing call Floor 10
D11	Down landing call Floor 11

ELEPLUS Board N°0



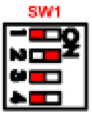
LABEL	DESCRIPTION
C00	Car control Floor 0
C01	Car control Floor 1
C02	Car control Floor 2
C03	Car control Floor 3
C04	Car control Floor 4
C05	Car control Floor 5
C06	Car control Floor 6
C07	Car control Floor 7
C08	Car control Floor 8
C09	Car control Floor 9
C10	Car control Floor 10
C11	Car control Floor 11

ELEPLUS Board N°1



LABEL	DESCRIPTION
C00	Car control Floor 12
C01	Car control Floor 13
C02	Car control Floor 14
C03	Car control Floor 15
C04	Car control Floor 16
C05	Car control Floor 17
C06	
C07	
C08	
C09	
C10	
C11	

ELEPLUS Board N°2



LABEL	DESCRIPTION
C00	Up landing call Floor 12
C01	Up landing call Floor13
C02	Up landing call Floor 14
C03	Up landing call Floor 15
C04	Up landing call Floor 16
C05	
C06	Down landing call Floor 12
C07	Down landing call Floor 13
C08	Down landing call Floor 14
C09	Down landing call Floor 15
C10	Down landing call Floor 16
C11	Down landing call Floor 17

Table 6 – Configuration of Landing calls and Car controls - Full Collective 18 Stops

17 – EXAMPLES OF DIAGRAMS

In this chapter are given a few examples of diagrams with ELEMPU and ELEPLUS Boards:

17.1 - A.P.B. OPERATION – HYDRAULIC

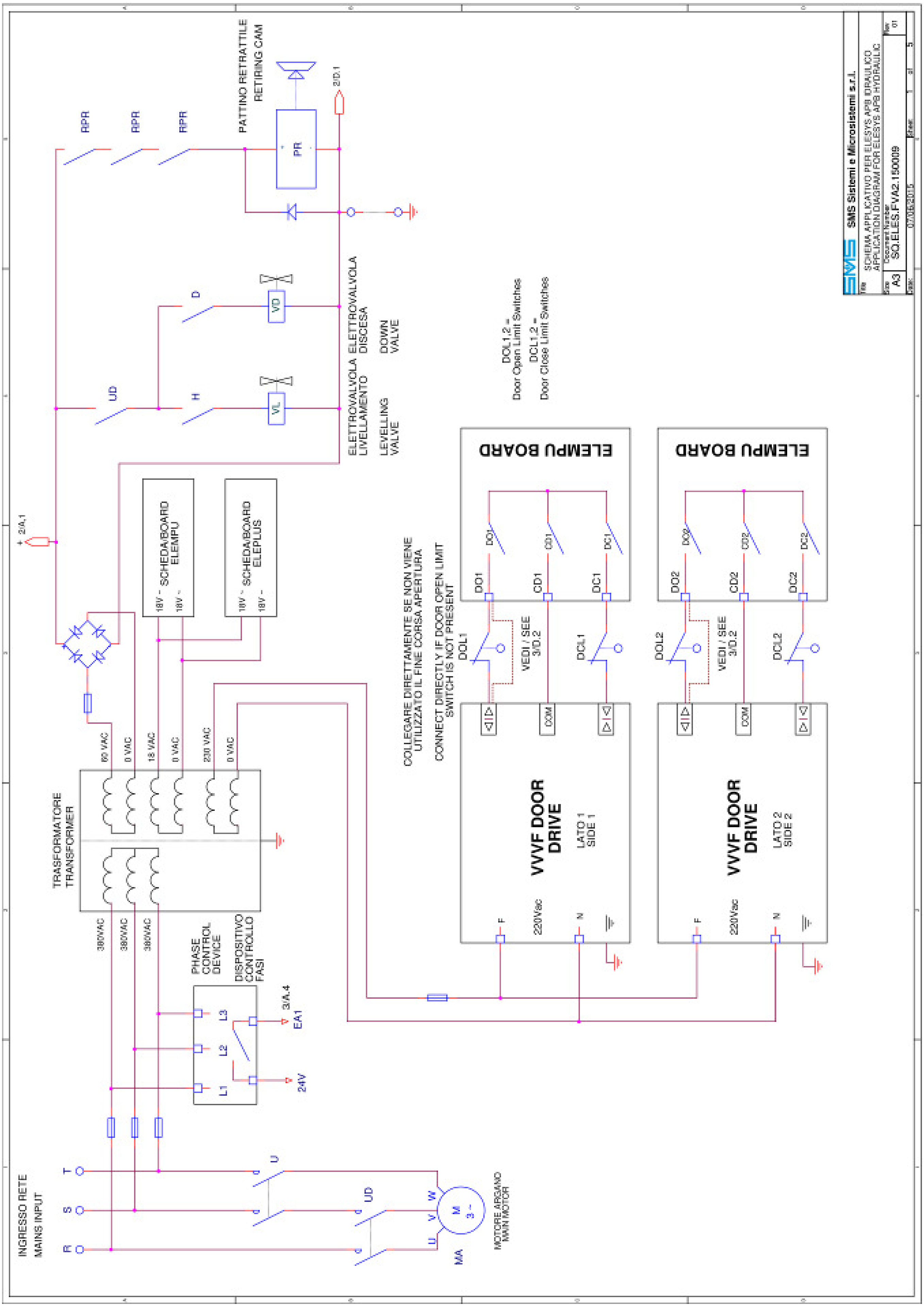
17.2 - FULL COLLECTIVE OPERATION – WITH VACON NXP VVVF DRIVE

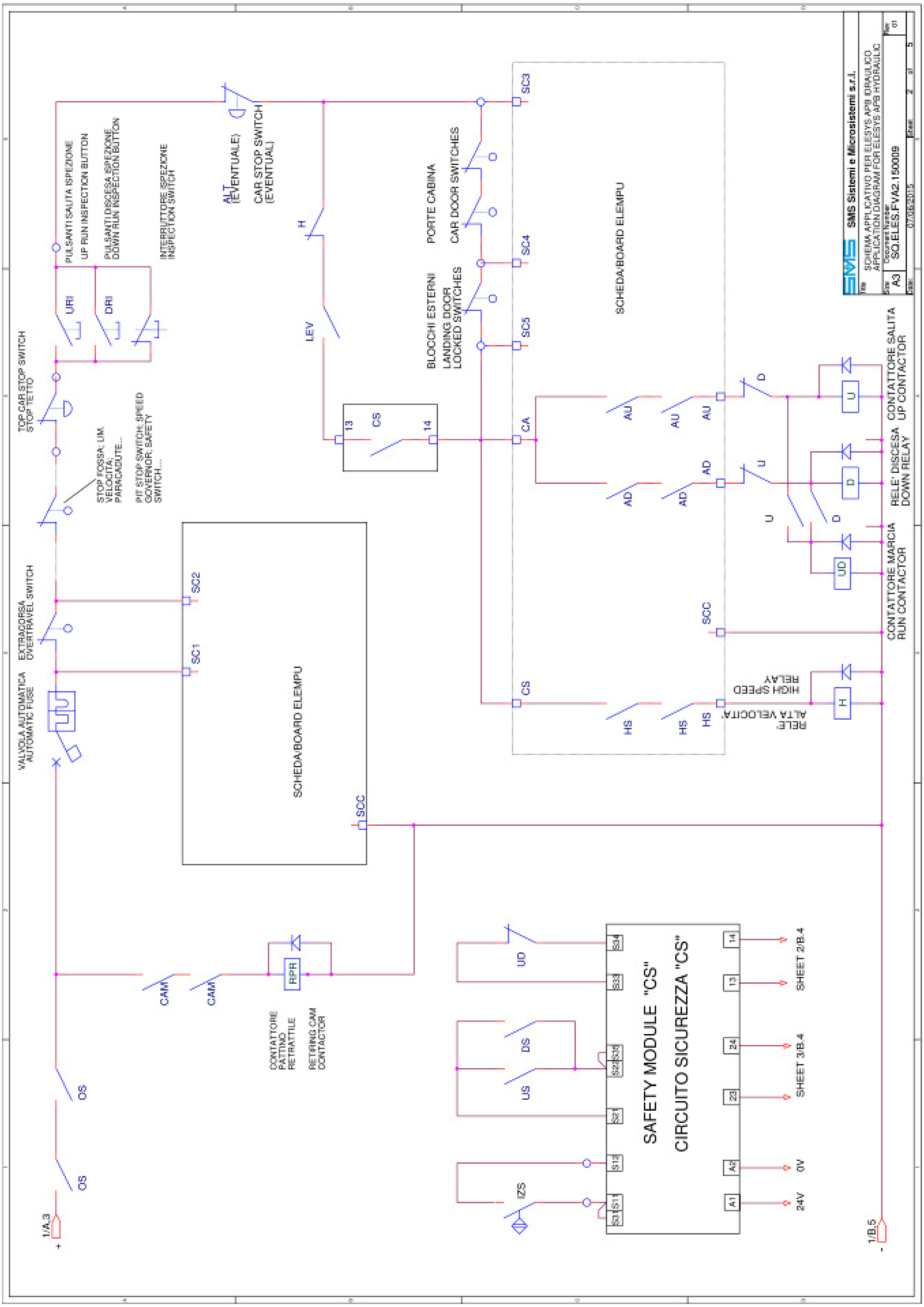
The connections of the safety chain and contactors must comply exactly the ones shown in the drawings, supply voltage can be changed, provided that it is compatible with the ELECTRICAL SPECIFICATIONS outlined in Chapter 6 of this Manual.

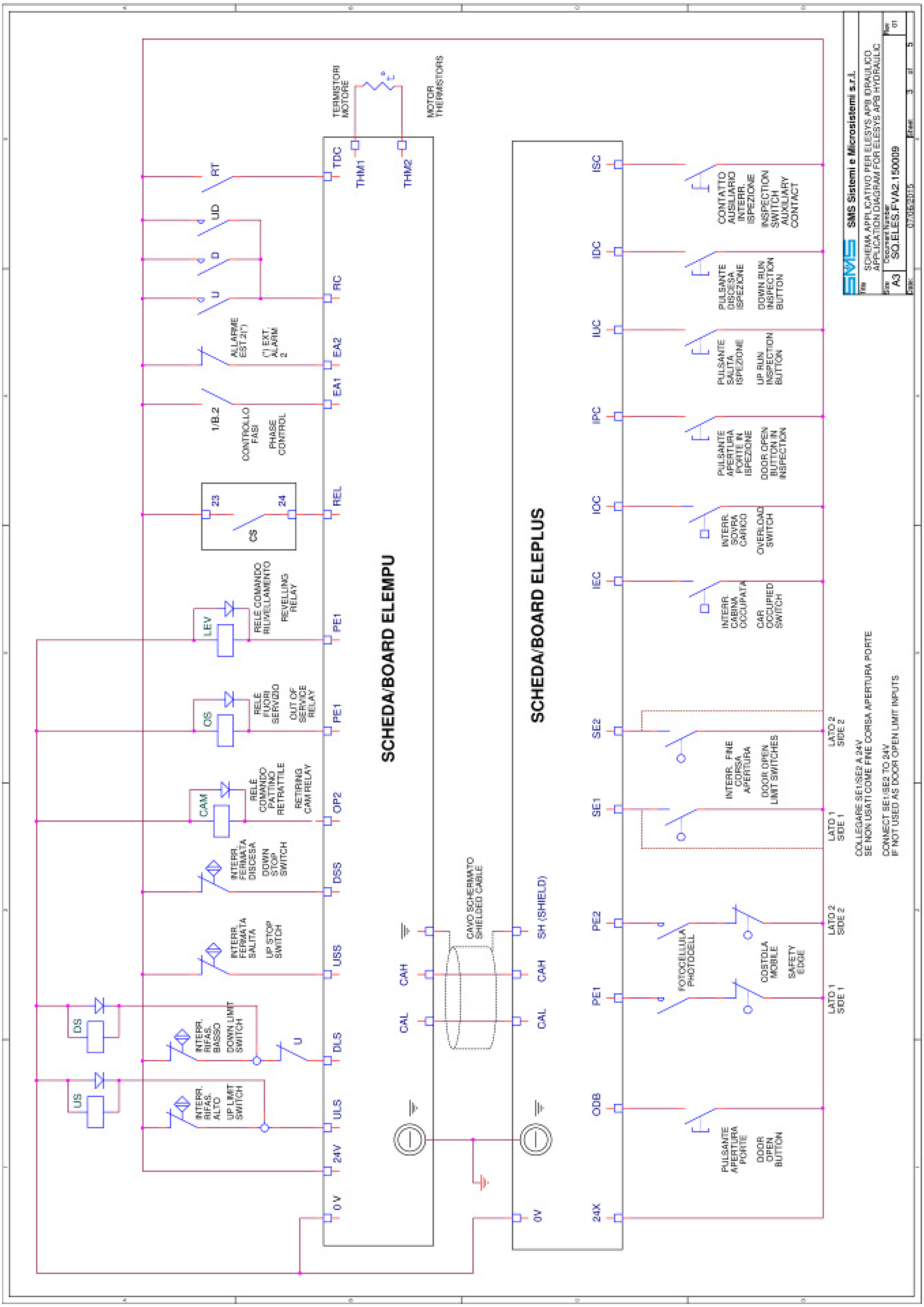
We have chosen to describe an operation voltage 48Vdc and, as an alternative to the examples of drawing in Chapter 9, the door motor here is controller by a VVVF drive, with supply voltage 230Vac; of course other solutions are possible.

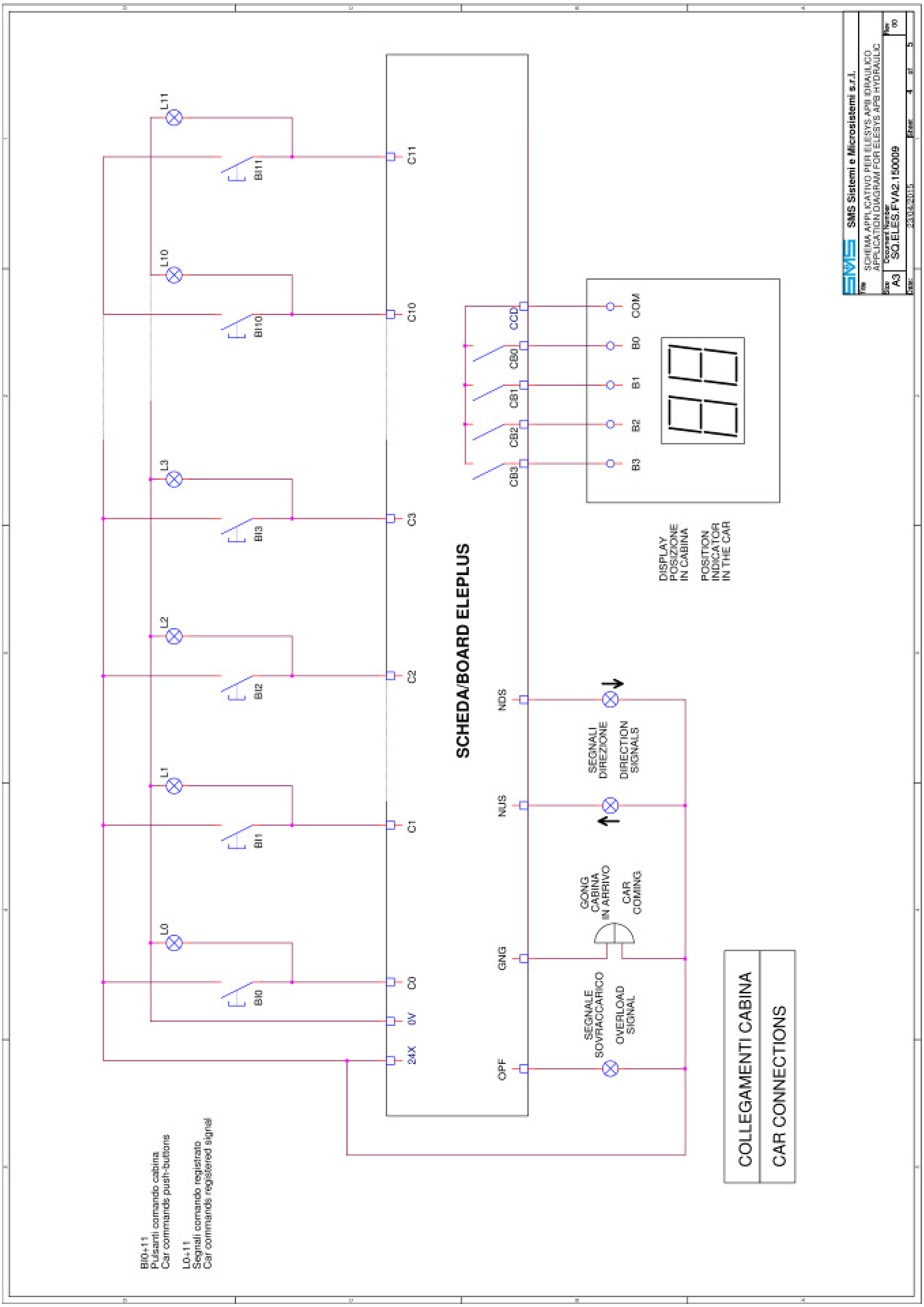
As a general rule, it is recommended to ALWAYS connect in parallel to the coils of relays, contactors, electromagnets, external to the board, a device for protection against surges, i.e. DIODES in the presence of DC voltage or directed voltage, or VARISTORS or RC FILTERS when it is important to quickly de-energize the equipment or in the presence of AC voltage.

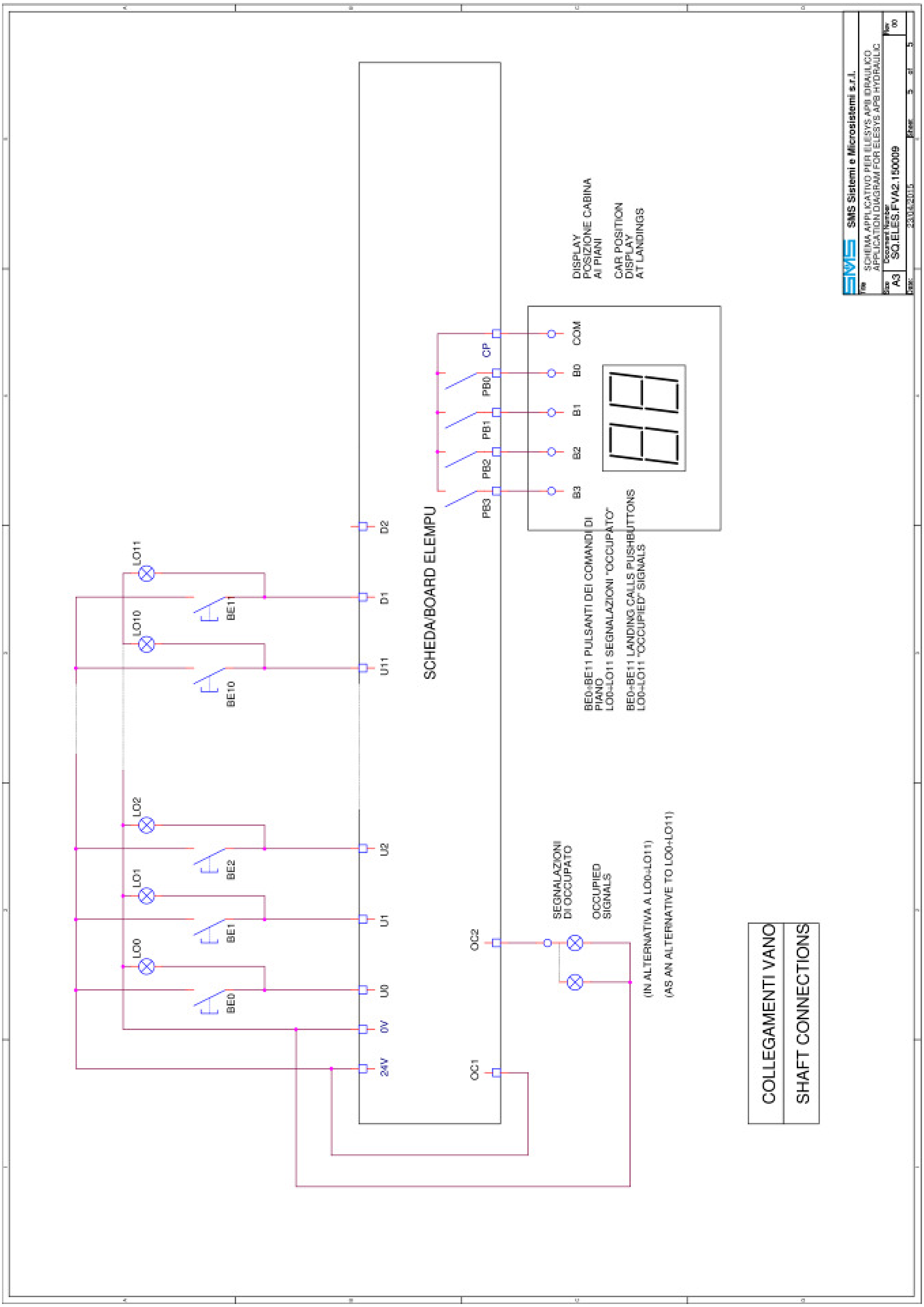
17.1 - CONTROL PANEL DIAGRAM EXAMPLE - A.P.B. OPERATION – HYDRAULIC



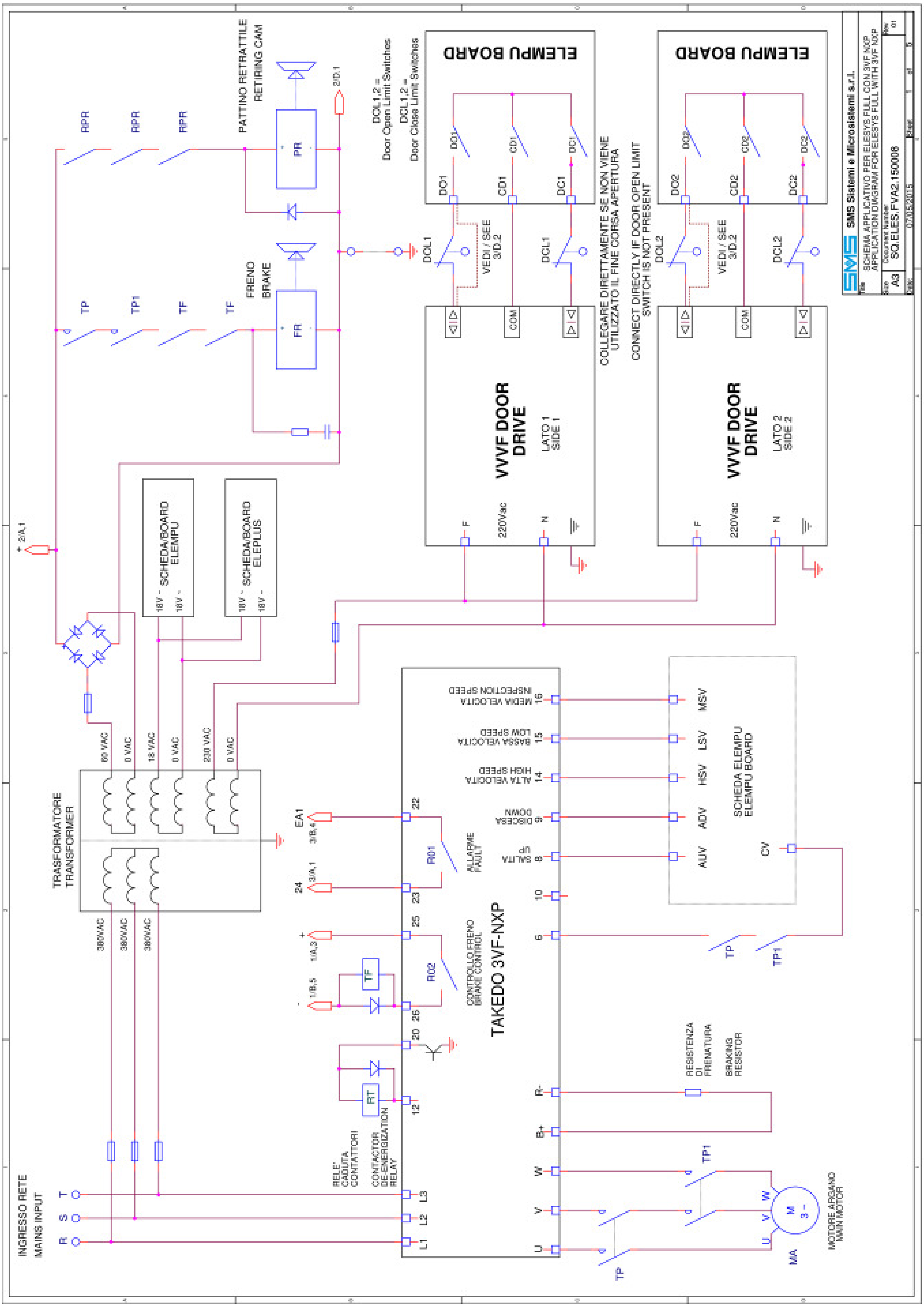

SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS APB IDRAULICO
APPLICATION DIAGRAM FOR ELESYS APB HYDRAULIC
SQ.ELES.FVA2.150009
A3
07/06/2015
SCHEDA/BOARD ELEMPU
SCHEDA/BOARD ELEMPU
SAFETY MODULE "CS"
CIRCUITO SICUREZZA "CS"
VALVOLA AUTOMATICA
AUTOMATIC FUSE
EXTRACORSA
OVERTRAVEL SWITCH
TOP CAR STOP SWITCH
STOP TETTO
PIT STOP SWITCH; SPEED GOVERNOR; SAFETY SWITCH....
STOP FOSSA; LIM. VELOCITA; PARACADUTE....
PULSANTI SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
PULSANTI DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
INTERRUTTORE ISPEZIONE
INSPECTION SWITCH
ALT (EVENTUALE)
CAR STOP SWITCH (EVENTUAL)
PORTE CABINA
CAR DOOR SWITCHES
BLOCCHI ESTERNI
LANDING DOOR LOCKED SWITCHES
CONTATTORE SALITA
UP CONTACTOR
RELE' DISCESA
DOWN RELAY
CONTATTORE MARCIA
RUN CONTACTOR
RELE' ALTA VELOCITA'
HIGH SPEED RELAY
CONTATTORE PATTINO RETRATTILE
RETIRING CAM CONTACTOR
SHEET 2/B.4
SHEET 3/B.4
24V
0V
1/A.3
1/B.5

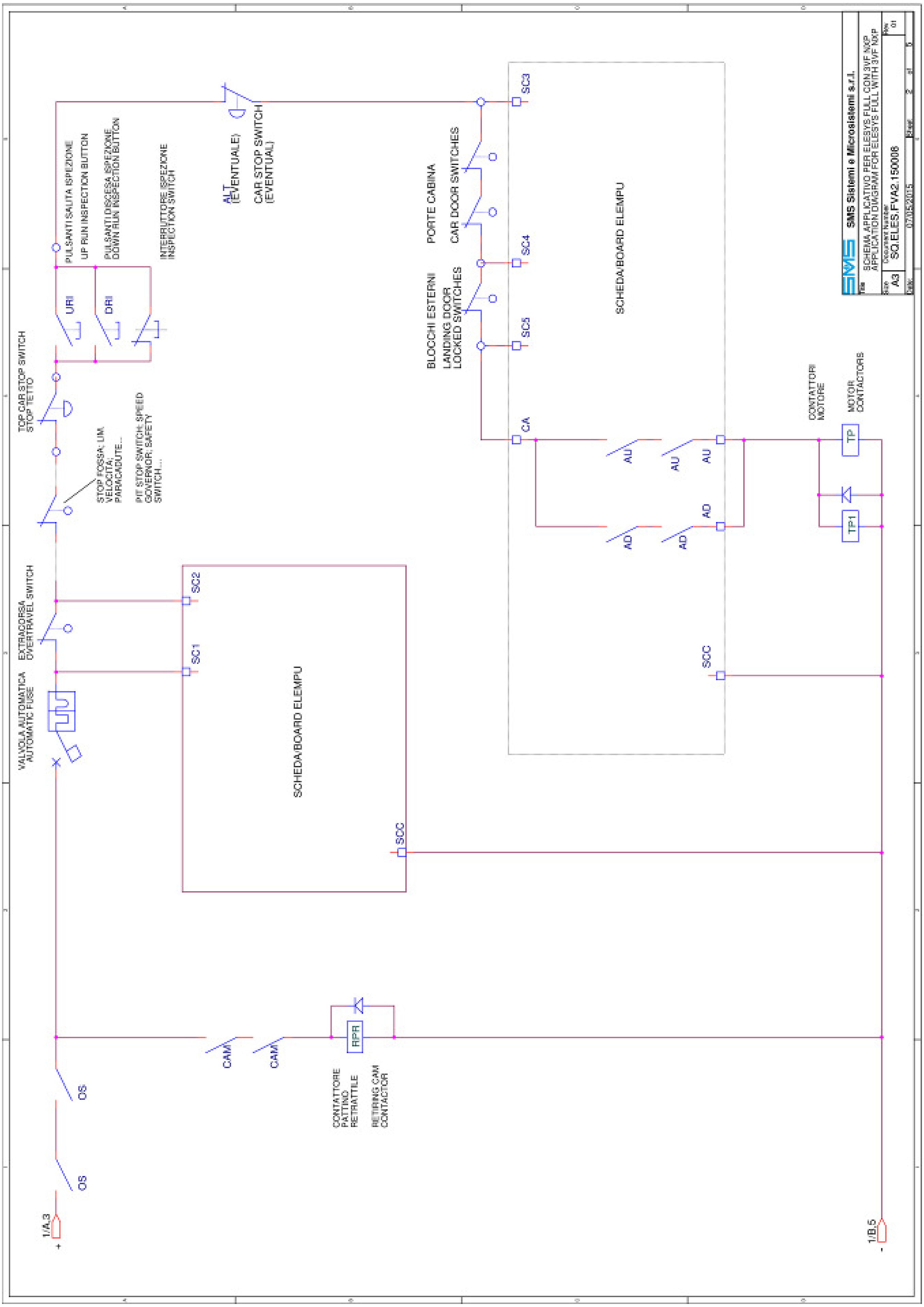

SCHEDA/BOARD ELEMPU
SCHEDA/BOARD ELEPLUS
TERMISTORI MOTORE
MOTOR THERMISTORS
TDC
THM1
THM2
RT
UD
D
U
RC
ALLARME EST.2(*)
(*) EXT. ALARM 2
EA2
EA1
1/B.2
CONTROLLO FASI
PHASE CONTROL
23
24
CS
REL
LEV
RELÈ COMANDO RILIVELLAMENTO
REVELLING RELAY
PE1
OS
RELÈ FUORI SERVIZIO
OUT OF SERVICE RELAY
CAM
RELÈ COMANDO PATTINO RETRATTILE
RETIRING CAM RELAY
OP2
INTERR. FERMATA DISCESA
DOWN STOP SWITCH
DSS
INTERR. FERMATA SALITA
UP STOP SWITCH
USS
DS
INTERR. RIFAS. BASSO
DOWN LIMIT SWITCH
DLS
US
INTERR. RIFAS. ALTO
UP LIMIT SWITCH
ULS
24V
0 V
CAVO SCHERMATO
SHIELDED CABLE
CAL
CAH
SH (SHIELD)
0V
24X
ISC
CONTATTO AUSILIARIO INTERR. ISPEZIONE
INSPECTION SWITCH AUXILIARY CONTACT
IDC
PULSANTE DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
IUC
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
IPC
PULSANTE APERTURA PORTE IN ISPEZIONE
DOOR OPEN BUTTON IN INSPECTION
IOC
INTERR. SOVRACCARICO
OVERLOAD SWITCH
IEC
INTERR. CABINA OCCUPATA
CAR OCCUPIED SWITCH
SE2
SE1
INTERR. FINE CORSA APERTURA
DOOR OPEN LIMIT SWITCHES
LATO 2 SIDE 2
LATO 1 SIDE 1
COLLEGARE SE1/SE2 A 24V SE NON USATI COME FINE CORSA APERTURA PORTE
CONNECT SE1/SE2 TO 24V IF NOT USED AS DOOR OPEN LIMIT INPUTS
PE2
PE1
FOTOCELLULA PHOTOCELL
COSTOLA MOBILE
SAFETY EDGE
ODB
PULSANTE APERTURA PORTE
DOOR OPEN BUTTON
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS APB IDRAULICO
APPLICATION DIAGRAM FOR ELESYS APB HYDRAULIC
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SCHEDA/BOARD ELEPLUS
C11
C10
C3
C2
C1
C0
0V
24X
BI11
BI10
BI3
BI2
BI1
BI0
L11
L10
L3
L2
L1
L0
CCD
CB0
CB1
CB2
CB3
COM
B0
B1
B2
B3
DISPLAY POSIZIONE IN CABINA
POSITION INDICATOR IN THE CAR
NDS
NUS
SEGNALI DIREZIONE
DIRECTION SIGNALS
GNG
GONG CABINA IN ARRIVO
CAR COMING
OPF
SEGNALE SOVRACCARICO
OVERLOAD SIGNAL
COLLEGAMENTI CABINA
CAR CONNECTIONS
BI0÷11
Pulsanti comando cabina
Car commands push-buttons
L0÷11
Segnali comando registrato
Car commands registered signal
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS APB IDRAULICO
APPLICATION DIAGRAM FOR ELESYS APB HYDRAULIC
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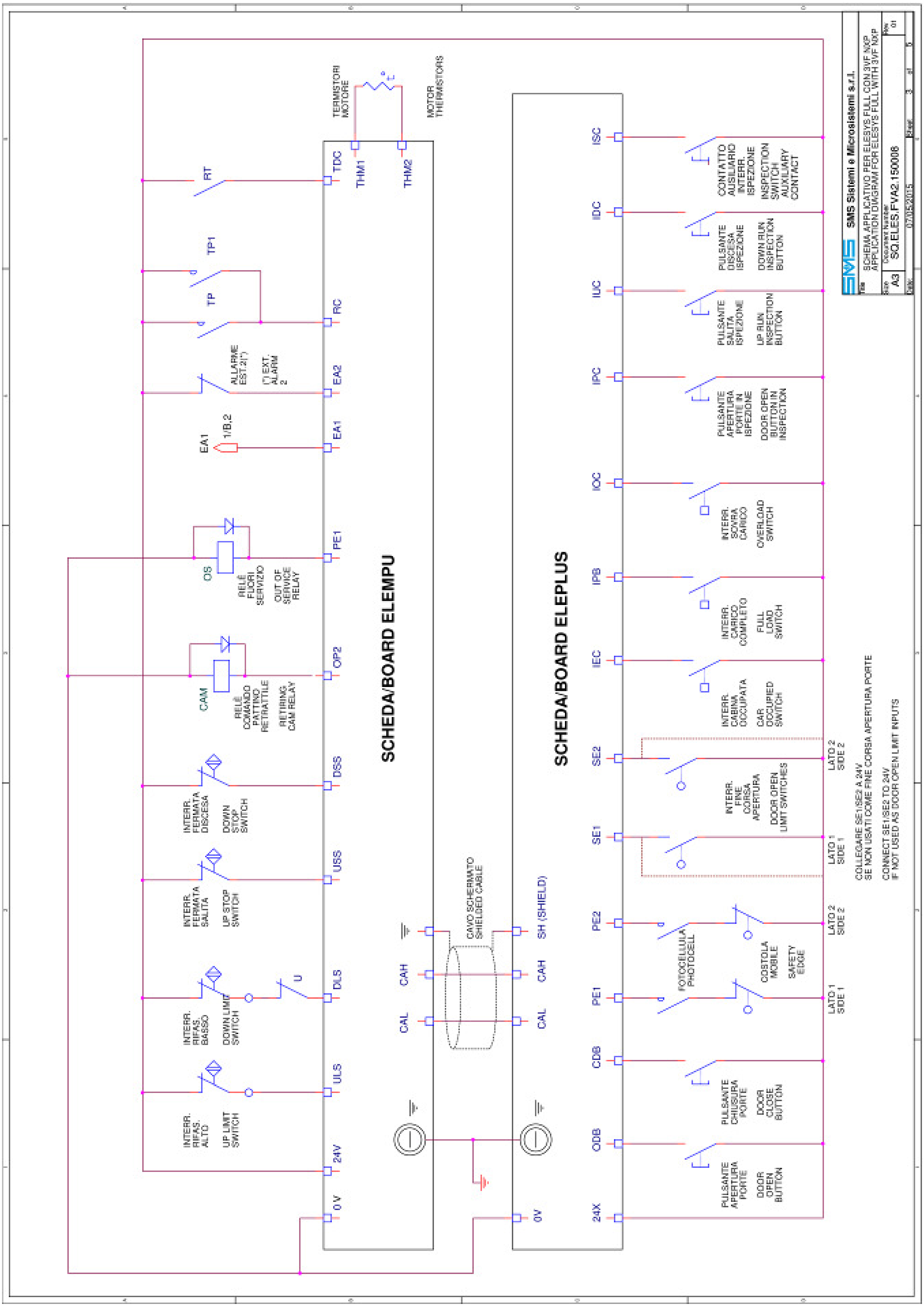

SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS APB IDRAULICO
APPLICATION DIAGRAM FOR ELESYS APB HYDRAULIC
A3
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DISPLAY
POSIZIONE CABINA
AI PIANI
CAR POSITION
DISPLAY
AT LANDINGS
COM
B0
B1
B2
B3
CP
PB0
PB1
PB2
PB3
SCHEDA/BOARD ELEMPU
D2
D1
U11
U2
U1
U0
0V
24V
OC1
OC2
LO11
LO10
LO2
LO1
LO0
BE11
BE10
BE2
BE1
BE0
BE0÷BE11 PULSANTI DEI COMANDI DI
PIANO
LO0÷LO11 SEGNALAZIONI "OCCUPATO"
BE0÷BE11 LANDING CALLS PUSHBUTTONS
LO0÷LO11 "OCCUPIED" SIGNALS
SEGNALAZIONI
DI OCCUPATO
OCCUPIED
SIGNALS
(IN ALTERNATIVA A LO0÷LO11)
(AS AN ALTERNATIVE TO LO0÷LO11)
COLLEGAMENTI VANO
SHAFT CONNECTIONS

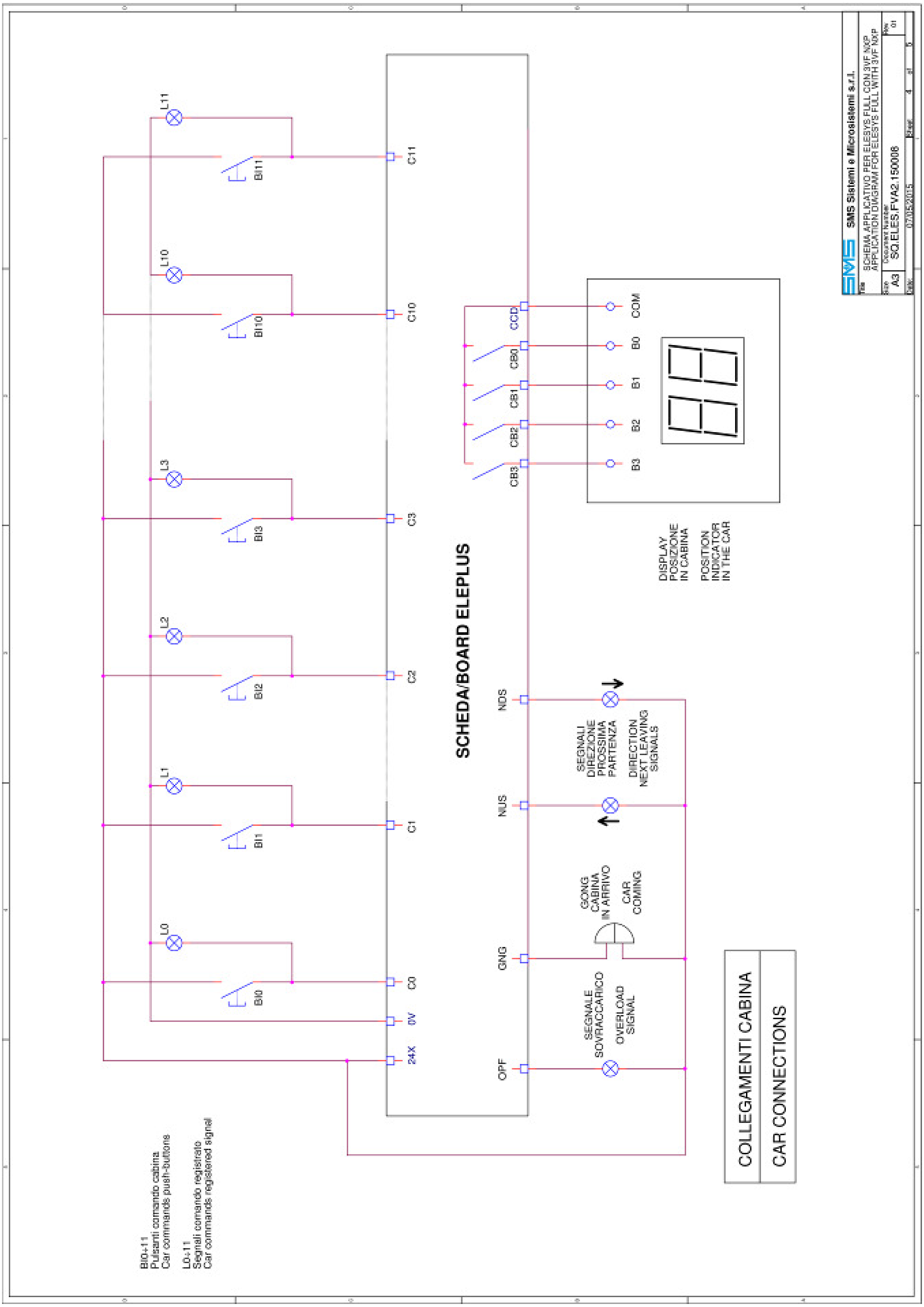
17.2 - CONTROL PANEL DIAGRAM EXAMPLE
FULL COLLECTIVE OPERATION – WITH VACON NXP VVVF DRIVE

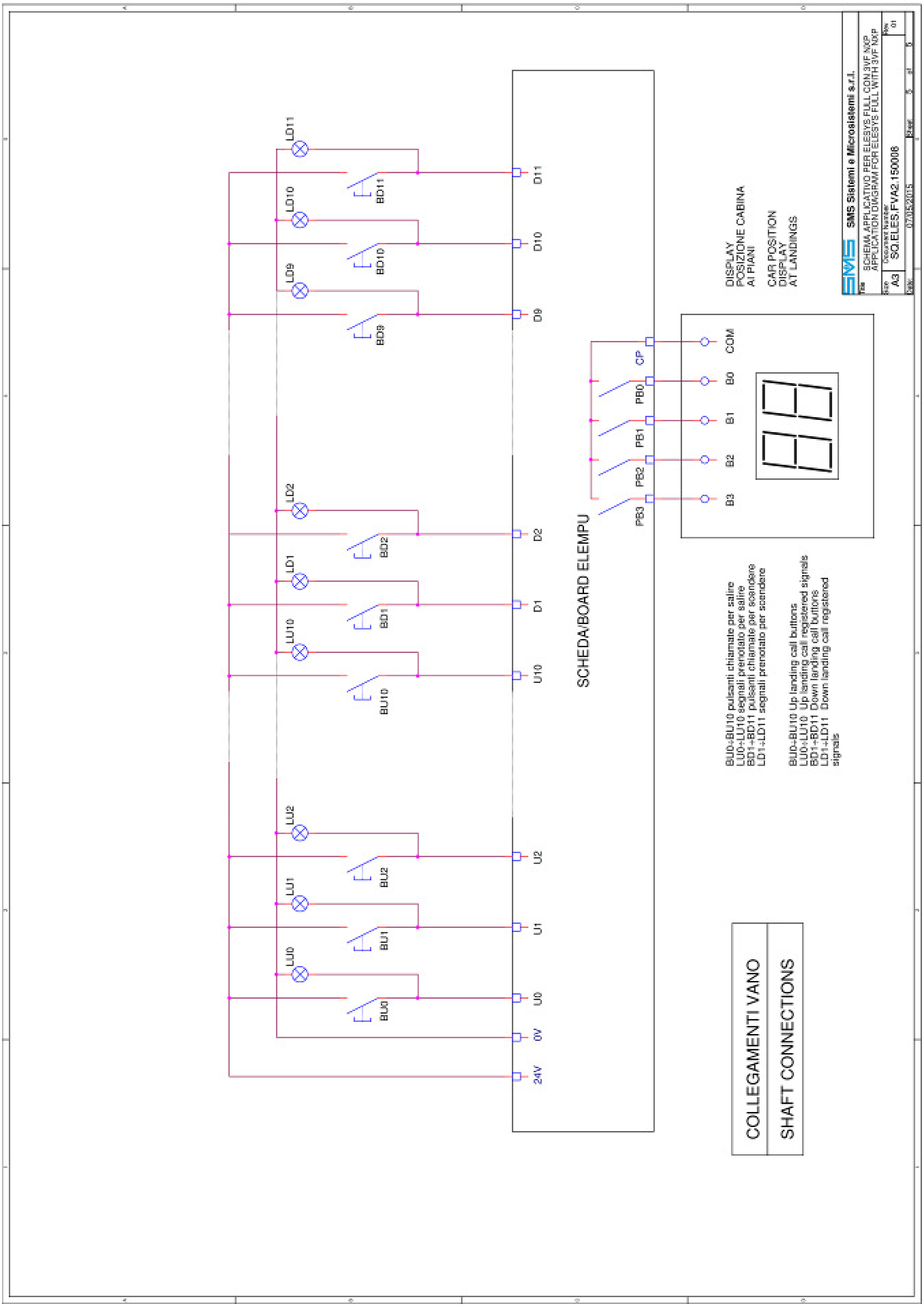




PULSANTI SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
PULSANTI DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
INTERRUTTORE ISPEZIONE
INSPECTION SWITCH
URI
DRI
ALT (EVENTUALE)
CAR STOP SWITCH (EVENTUAL)
PORTE CABINA
CAR DOOR SWITCHES
BLOCCHI ESTERNI
LANDING DOOR LOCKED SWITCHES
SC3
SC4
SC5
CA
SCHEDA/BOARD ELEMPU
AU
AU
AU
AD
AD
AD
SCC
CONTATTORI MOTORE
MOTOR CONTACTORS
TP
TP1
TOP CAR STOP SWITCH
STOP TETTO
STOP FOSSA; LIM. VELOCITA; PARACADUTE...
PIT STOP SWITCH; SPEED GOVERNOR; SAFETY SWITCH...
EXTRACORSA
OVERTRAVEL SWITCH
VALVOLA AUTOMATICA
AUTOMATIC FUSE
SC2
SC1
SCHEDA/BOARD ELEMPU
SCC
CAM
CAM
RPR
CONTATTORE PATTINO RETRATTILE
RETIRING CAM CONTACTOR
OS
OS
1/A,3
+
1/B,5
-
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SCHEMA APPLICATIVO PER ELESYS FULL CON 3VF NXP
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SCHEDA/BOARD ELEMPU
SCHEDA/BOARD ELEPLUS
TERMISTORI MOTORE
MOTOR THERMISTORS
TDC
THM1
THM2
RT
TP1
TP
RC
ALLARME EST.2(*)
(*) EXT. ALARM 2
EA2
EA1
1/B.2
OS
RELÈ FUORI SERVIZIO
OUT OF SERVICE RELAY
PE1
CAM
RELÈ COMANDO PATTINO RETRATTILE
RETIRING CAM RELAY
OP2
INTERR. FERMATA DISCESA
DOWN STOP SWITCH
DSS
INTERR. FERMATA SALITA
UP STOP SWITCH
USS
INTERR. RIFAS. BASSO
DOWN LIMIT SWITCH
U
DLS
INTERR. RIFAS. ALTO
UP LIMIT SWITCH
ULS
24V
0 V
CAVO SCHERMATO
SHIELDED CABLE
CAH
CAL
SH (SHIELD)
0V
ISC
IDC
IUC
IPC
IOC
IPB
IEC
SE2
SE1
PE2
PE1
CDB
ODB
24X
CONTATTO AUSILIARIO INTERR. ISPEZIONE
INSPECTION SWITCH AUXILIARY CONTACT
PULSANTE DISCESA ISPEZIONE
DOWN RUN INSPECTION BUTTON
PULSANTE SALITA ISPEZIONE
UP RUN INSPECTION BUTTON
PULSANTE APERTURA PORTE IN ISPEZIONE
DOOR OPEN BUTTON IN INSPECTION
INTERR. SOVRA CARICO
OVERLOAD SWITCH
INTERR. CARICO COMPLETO
FULL LOAD SWITCH
INTERR. CABINA OCCUPATA
CAR OCCUPIED SWITCH
INTERR. FINE CORSA APERTURA
DOOR OPEN LIMIT SWITCHES
LATO 2
SIDE 2
LATO 1
SIDE 1
FOTOCELLULA
PHOTOCELL
COSTOLA MOBILE
SAFETY EDGE
PULSANTE CHIUSURA PORTE
DOOR CLOSE BUTTON
PULSANTE APERTURA PORTE
DOOR OPEN BUTTON
COLLEGARE SE1/SE2 A 24V SE NON USATI COME FINE CORSA APERTURA PORTE
CONNECT SE1/SE2 TO 24V IF NOT USED AS DOOR OPEN LIMIT INPUTS
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELESYS FULL WITH 3VF NXP
A3
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01
3
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L11
L10
L3
L2
L1
L0
BI11
BI10
BI3
BI2
BI1
BI0
C11
C10
C3
C2
C1
C0
0V
24X
SCHEDA/BOARD ELEPLUS
CCD
CB0
CB1
CB2
CB3
COM
B0
B1
B2
B3
DISPLAY POSIZIONE IN CABINA
POSITION INDICATOR IN THE CAR
NDS
NUS
GNG
OPF
SEGNALI DIREZIONE PROSSIMA PARTENZA
DIRECTION NEXT LEAVING SIGNALS
GONG CABINA IN ARRIVO
CAR COMING
SEGNALE SOVRACCARICO
OVERLOAD SIGNAL
COLLEGAMENTI CABINA
CAR CONNECTIONS
BI0÷11
Pulsanti comando cabina
Car commands push-buttons
L0÷11
Segnali comando registrato
Car commands registered signal
SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELESYS FULL WITH 3VF NXP
A3
SQ.ELES.FVA2.150008
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5
01



SMS Sistemi e Microsistemi s.r.l.
SCHEMA APPLICATIVO PER ELESYS FULL CON 3VF NXP
APPLICATION DIAGRAM FOR ELESYS FULL WITH 3VF NXP
A3
SQ.ELES.FVA2.150008
07/05/2015
DISPLAY POSIZIONE CABINA AI PIANI
CAR POSITION DISPLAY AT LANDINGS
COM
B0
B1
B2
B3
CP
PB0
PB1
PB2
PB3
SCHEDA/BOARD ELEMPU
D11
D10
D9
D2
D1
U10
U2
U1
U0
0V
24V
LD11
LD10
LD9
LD2
LD1
LU10
LU2
LU1
LU0
BD11
BD10
BD9
BD2
BD1
BU10
BU2
BU1
BU0
BU0÷BU10 pulsanti chiamate per salire
LU0÷LU10 segnali prenotato per salire
BD1÷BD11 pulsanti chiamate per scendere
LD1÷LD11 segnali prenotato per scendere
BU0÷BU10 Up landing call buttons
LU0÷LU10 Up landing call registered signals
BD1÷BD11 Down landing call buttons
LD1÷LD11 Down landing call registered signals
COLLEGAMENTI VANO
SHAFT CONNECTIONS

ANNEX 1

ALARM CODES

ALARM CODE		DESCRIPTION	CONSEQUENCES
E 02	FAILURE TO CLOSE LANDING DOOR LOCKED SWITCHES	Upon leaving, with the doors fully closed (input SC4 active), the input SC5 is not activated within 5 seconds. The description of the alarm E02 is completed with the number of the floor where the alarm has occurred.	A.P.B. OPERATION The call is cancelled, the doors will reopen and the car is waiting for a new call. COLLECTIVE OPERATION The car and landing calls remain recorded and 5 attempts will be performed: if the problem persists, all calls are cancelled and the car remains in service, waiting for new calls. MULTIPLEX OPERATION The calls are not cancelled but are transferred to the other cars.
E 03	FAILURE TO ACTIVATE MOTOR CONTACTORS	Upon leaving, with locked doors (input SC5 active), input RC is not activated within 2 seconds. The description of the alarm E 03 is completed with the number of the floor where the alarm has occurred.	
E 05	CAR DOES NOT MOVE	Upon leaving, after the closing of contactors, the car does not move out from the stop zone within 10 seconds. The description of the alarm E 05 is completed with the number of the floor where the alarm has occurred.	
E 06	RESET FAILURE	The car is unable to complete the reset operation.(arrival at the end floor and doors opening).	The system waits for a next call to try again the reset operation.
E 07	CAR DOORS FAIL TO CLOSE	The doors do not complete the closing (SC4 = ON) within the time set in F 23.	The call is cancelled, the doors will reopen and the car is waiting for a new call. COLLECTIVE OPERATION The car and landing calls remain recorded and 5 attempts will be performed: if the problem persists, all calls are cancelled and the car remains in service, waiting for new calls. MULTIPLEX OPERATION The calls are not cancelled but are transferred to the other cars. If the timer intervenes in the CLOSING FOR PARKING or RESET procedure, 5 closing attempts will be performed, after which the car will park with the doors open.
E 08	CAR DOORS FAIL TO OPEN	The doors do not complete the opening within the time set in F 22.	Door motor control is disabled and the lift normally remains in service.
E 09	HIGH SPEED MAXIMUM TRAVEL TIME TRIGGERED	The car is moving at high speed without reaching the next floor within the time set in F 24.	The lift is set to OUT OF SERVICE. Service is restored only after a manual RESET to be performed using the keys ← and →.
E 10	LOW SPEED MAXIMUM TRAVEL TIME TRIGGERED	The car moves at low speed without reaching the floor within the time set in F 25.	The lift is set to OUT OF SERVICE. Service is restored only after a manual RESET to be performed using the keys ← and →.
E 11	RELEVELING MAXIMUM TRAVEL TIME TRIGGERED	The car is in releveling phase without reaching the floor within the time set in F 50.	The lift is set to OUT OF SERVICE. OS output is disabled. Service is restored only after a manual RESET to be performed using the keys ← and →.

ALARM CODE		DESCRIPTION	CONSEQUENCES
E 12	FAILURE TO DEACTIVATE CONTACTORS	The RC input (RUN contactors) do not turn off within 2 seconds from deactivation command (deactivation of outputs AU / AD).	Subsequent leaving is prevented for the entire time in which RC remains active.
E 13	FLOOR COUNT ERROR	Car position indicates an end floor but no limit switch is active.	A call is made to the opposite end floor to reset the car position.
E 14	OVERTRAVEL	Opening of overtravel switch (input SC2 - 1st section of safety chain)	The lift is set to **OUT OF SERVICE**. Service is restored only after a manual RESET to be performed using the keys 🡐 and 🡒**.**
E 15	MOTOR THERMISTORS PROTECTION TRIGGERED	Motor thermistors (connected to the input TH1 - TH2) have detected a rise in motor temperature up to the threshold of protection.	The car stops with the mode defined by F 33, then the elevator is set to **OUT OF SERVICE**. OS output is disabled. Service can be restored in AUTOMATIC or MANUAL mode (depending on how F12 is set), performing the reset procedure.
E 16	EXTERNAL ALARM 1	The contact connected to the input EA1 is open (for example the alarm contact of the VVVF).	The lift is set to **OUT OF SERVICE**. OS output is disabled. Normal operation is automatically reset when the contact closes, performing the reset procedure.
E 17	EXTERNAL ALARM 2	The contact connected to the input EA2 is open (for example, the contact of the oil thermostat).	The lift stops at the end of the current travel and a subsequent leaving is prevented. Normal operation is automatically reset when the contact closes.
E 18	NO OPERATING VOLTAGE	There is no voltage at the input SC1 (upstream of the safety chain)	The lift stops and a subsequent leaving is prevented. The lift returns the service automatically when the voltage is restored.
E 20	MAXIMUM TIME PHOTOCELL OR SAFETY EDGE INTERRUPTED	Contact connected to the input IP1 is open for a time greater than 20 sec.	Leaving is prevented as long as such condition is active. Normal operation is automatically restored when the contact closes.

ANNEX 2

FUNCTIONS FOR SYSTEM CONFIGURATION

IMPORTANT
The functions with gray background are not implemented in ELEMPU STAND-ALONE.

FUNCTION F		ALLOWED VALUES AND MEANING	DEFAULT
F 01	TOP FLOOR	1 ÷ MAX F. MAX F. = 11 for A.P.B. operation = 11 for DOWN COLLECTIVE operation. = 8 for FULL COLLECTIVE operation	11
F 02	MAIN FLOOR	0 ÷ MAX F. It is used to properly manage calls from floors in case of DOWN COLLECTIVE operation, when the main floor does not coincide with the bottom floor.	0
F 03	LIFT OPERATION	- A.P.B. Automatic Push-Button Operation - DOWN COLLECTIVE - FULL COLLECTIVE	A.P.B.
F 04	DRIVE TYPE	- 1 SPEED - 2 SPEEDS - VVVF - HYDRAULIC	2 SPEEDS
F 05	DOOR TYPE	- MANUAL both in the car and at landing - SEMIAUTOMATIC automatic doors in the car and manual doors at landing - AUTOMATIC both in the car and at landing	AUTOMAT.
F 06	DOOR AT FLOOR	- OPEN DOORS - CLOSED DOORS	CLOSED DOORS
F 07	CAR ENTRANCES	- 1 - 2	1
F 08	DOOR OPENING P0 DOOR OPENING P1 DOOR OPENING P2 . . . . DOOR OPENING MAX F.	- SIDE 1 open side 1 door only - SIDE 2 open side 1 door only - SIMULTAN. open both side 1 and 2 doors simultaneously - SELECTIVE **available with later software release** **see Note at Page 71** - NONE to be used, for example, for entrance with manual doors	SIDE 1
F 09	INSPECTION SPEED	- LOW - HIGH	LOW
F 10	FORCED DOOR CLOSING	- NO - YES DOOR CLOSING control remains active while the lift moving	NO
F 11	CALLS CANCELLATION	- SELECTIVE when reaching a floor it cancels only the call with the same car direction - SIMULTANEOUS when approaching a floor, it always cancels both up and down calls Valid only for FULL COLLECTIVE operation.	SELECTIVE
F 12	THERMISTORS ALARM RESET	- MANUAL the operation is prevented until manual reset - AUTOMATIC the operation is restored automatically after 10 minutes from thermistors return to normal status	MANUAL
F 13	AUTOMATIC RETURN	- NO - YES Valid only for the traction lifts; for the hydraulic systems the return to bottom floor is always enabled.	NO
F 14	AUTOMATIC RETURN FLOOR	0 ÷ MAX F. Valid only if the previous F 13 = YES	0
F 15	V.I.P. CALL FLOOR	0 ÷ MAX F. Floor that must be reached by the car in response to activation of the VIC input (see Chapter 6.8)	1

FUNCTION F		ALLOWED VALUES AND MEANING	DEFAULT
F 16	STOP DELAY	0,0 ÷ 2.0 sec. It is the delay time between the opening of the stop switch and the actual stop of the car. By taking advantage of this delay it is always possible to have the same stop zone, regardless of the type and the speed of the lifts system.	0
F 17	CONTACTORS OPENING DELAY	0,0 ÷ 2.0 sec. Valid only for VVVF drive, when TDC input is not used	2,0
F 18	EMERGENCY STOP DELAY	0,0 ÷ 2.0 sec. It is the equivalent of F 16 for "emergency" operation.	2,0
F 19	RETIRING CAM DROP DELAY	0,0 ÷ 2.0 sec. It is the delay time between the opening of the contactors and the opening of the relay which controls the retiring cam (CAM) It can be useful, for example, in lifts with 1-speed drive, to control the cam drop when the car is already stopped (at the end of the braking).	0,3
F 20	DOOR OPENING DELAY	0,0 ÷ 2.0 sec. It is the delay time between the opening of the contactors and command for door opening It can be useful for example in lifts with automatic doors and retiring cam to ensure that the doors begin to open when the cam has already dropped.	0,5
F 21	MAXIMUM EMERGENCY TIME	1 ÷ 15 minutes If the emergency procedure is not completed within this time, it will be interrupted; to restore the operation you need to disable the ROP input.	15
F 22	DOOR OPENING TIME	1 ÷ 60 sec. Protection of the door motor for opening; set a time 1 second higher than the time normally required to fully open the doors.	5
F 23	DOORS CLOSING TIME	1 ÷ 60 sec. Protection of the door motor for closing; set a time a few seconds higher than the time normally required to fully close the doors.	20
F 24	MAX. TRAVEL TIME HIGH SPEED	1 ÷ 45 sec. It does not depend on the travel of the lift because it starts from 0 at every passage from a floor.	45
F 25	MAX. TRAVEL TIME LOW SPEED	1 ÷ 45 sec.	45
F 26	START DELAY TIME	1 ÷ 60 sec. Valid only for COLLECTIVE operation. It is the stop time of the car at floor with the doors open before the next leaving due to a command or existing call.	2
F 27	OCCUPIED TIME	1 ÷ 60 sec. In the A.P.B. operation this is the classic delay that controls the "OCCUPIED" signal and disables calls from landing control stations. In COLLECTIVE operation, this is the stop time of the car at floor with the doors open before reversing direction to serve calls in the opposite direction. It must be greater than the time set in F 26.	5
F 28	AUTOMATIC RETURN ACTIVATION DELAY	1 ÷ 15 minutes Valid for both traction and hydraulic lifts.	15
F 29	GONG ACTIVATION TIME	0.1 ÷ 3.0 sec. It is the time during which is active the acoustic signal of car coming at floor, at the beginning of door opening, or after the stop in the case of manual doors.	0,5
F 30	FAN / CAR LIGHT TIME	1 ÷ 255 sec. Controls the LC output and determines how long this output must remain active after the “Occupied” state is off.	10
F 31		0 UNUSED	0
F 32	TYPE OF MAGNETIC SWITCHES	- NORMALLY OPEN N.O. contact - NORMALLY CLOSED N.C. contact Refers to the magnetic switches USS and DSS for floor count and stop, the limit switches ULS and DLS must always be NORMALLY CLOSED (N.C.)	NORMALLY CLOSED
F 33	THERMISTORS STOP	Defines the stop mode of the car following a THERMISTORS Alarm: - END RUN (at the end of the travel) - IMMEDIATE STOP	IMMEDIATE STOP

FUNCTION F		ALLOWED VALUES AND MEANING	DEFAULT
F 34	RELEVELING STOP DELAY	0,0 ÷ 2.0 sec. It is the equivalent of F 16 for "releveling" operation.	0,0
F 35	NEXT CAR LEAVING DIRECTION SIGNAL	- OFF during TRAVEL - ON during TRAVEL Valid only for COLLECTIVE operation, in the first case, the signal is active from the stop at floor until the next leaving, in the second case it remains even during the travel, indicating the direction of travel.	OFF during TRAVEL
F 36	EMERGENCY FLOOR	0 ÷ MAX F.	0
F 37	CONTACTOR INPUT TYPE (RC)	- ACTIVE HIGH connection to RC: N.O. contacts in parallel of the contactors -BOTTOM ACTIVE connection to RC: N.C. contacts in series Choose the control logic of the contactor control according to the availability of auxiliary contacts.	TOP ACTIVE
F 38	CONTACTOR INPUT MODE (RC)	- UP & DOWN control is always done, both in up and down run - UP ONLY the control is made only during up run The function UP ONLY is required for the hydraulic systems where there is no relay/contactor for down run, as the down valve is controlled downstream of the safety chain.	ALWAYS
F 39	LIFT GROUP	- SIMPLEX - DUPLEX - TRIPLEX Valid only for COLLECTIVE / MULTIPLEX operation; set in accordance with the total number of cars combined (single car = SIMPLEX).	SIMPLEX
F 40	LIFT NUMBER	- 0 ÷ 2 Valid only for MULTIPLEX operation. Identifies the car within a group: 0 = Car 1, 1 = Car 2, 2 = Car 3	0
F 41	ZONE TIME OUT	1 ÷ 5 minutes Valid only for MULTIPLEX operation. Indicates the maximum time one ZONE (one or more calls) can wait to be assigned to a car; after this time, the ZONE becomes a priority one.	5
F 42	EARLY DOOR OPENING	- NOT ACTIVE advanced opening not enabled. - ON SLOWING opening is controlled at the beginning of slowdown. An external safety circuit must provide the bypass of the door safety switches in the allowed door zone and enable the opening command at the suitable time. - AT FLOOR the opening command is given when the car reaches the door unlocking zone (USS or DSS engaged). An external safety circuit must provide the bypass of the door safety switches in the allowed door zone.	INACTIVE
F 43	MISSING FLOOR	- NONE - BOTTOM FLOOR - TOP FLOOR - OTHER CAR BOTTOM - OTHER CAR TOP Valid in case of "LAME" DUPLEX " operation i.e. in the particular case in which one or both cars cannot reach an end floor, served instead by the other car.	NONE
F 44	FIRE-FIGHTERS OPERATION	- NONE - EN81 – 72 - EN81 – 73 These functions, from F 44 to F 47 refer to the FIRE-FIGHTERS OPERATION. For a detailed explanation of the OPERATION and the FUNCTIONS, see Chapter 3.9 - FIRE-FIGHTERS OPERATION AS PER EN81-72 & 73.	NONE
F 45	FIRE-FIGHTERS FLOOR 1	0 ÷ MAX F. (see Note Pag.71)	0
F 46	FIRE FIGHTERS FLOOR 2	0 ÷ MAX F. (see Note Pag.71)	0
F 47	DOORS CLOSING PHASE 1	- NO - YES	NO

FUNCTION F		ALLOWED VALUES AND MEANING	DEFAULT
F 48	CAR LIGHT TIME UNIT	- SECONDS - MINUTES It allows you to change the unit of measurement for the time set in F 30 (1÷255 sec.), because turning car light off and on too frequently is not correct and 255 seconds could not be enough.	SECONDS
F 49	STAND-BY TIME	0 ÷ 255 minutes Allows controlling system's stand-by state, which is activated setting in this function a time different from 0. (see Chapter Cap. 15.1)..	0
F 50	RELEVELING MAX. TRAVEL TIME	0 ÷ 255 sec.	10
F 51	EXPANSIONS	- NO the ELEMPU Bard is used as STANDALONE board - SI' there are ONE or MORE ELEPLUS Boards	NO
F 52	DOOR CLOSING HOLDING TIME	0,0 ÷ 3,0 sec. It's the time the automatic door closing command holds ON, after the safety chain car door input SC4 is closed, in order to allow the complete mechanical closing.	1,0

F45 – F 46

Function F45 is the designated fire-fighters floor no.1, activated by the FO input, prior compared to IPA, which is instead relative to the F46 function, designated fire-fighters floor no.2.
The programmable value in F45 and F46 goes from 0 to the top floor, but 0 defines the "not leaving" of the car during PHASE1, meaning the opening of the doors directly at the floor in which the lift is stopped.
This means that if you want to bring the lift to floor 0, actually you need to set for example F45 = 1.
More generally, when the lift needs to be brought to a specific floor, the value of F45 and F46 must be set at the floor number plus 1.

ANNEX 3

SWITCHES AND MAGNETS FOR TRACTION LIFT SYSTEMS

ULS, DLS
Top and bottom floor
limit switches

USS
Up Stop Switch
(Down Slowing-down)

DSS
Down Stop Switch
(Up Slowing-down)

X1 = Up Slowing-down space

X2 = Up Stop space

Y1 = Down Slowing-down space

Y2 = Down Stop space

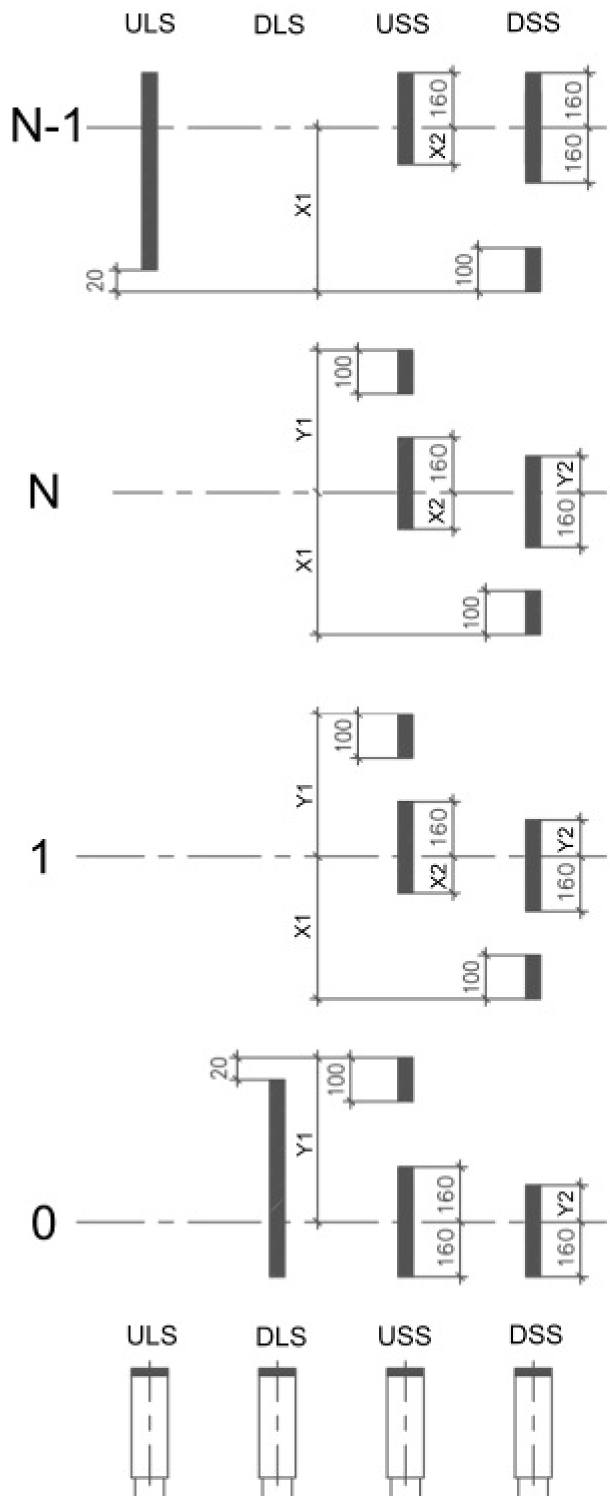


Fig. 19

ANNEX 4

SWITCHES AND MAGNETS FOR HYDRAULIC LIFT SYSTEM

Compared to the traction lift systems (see Fig. 19), an added switch is needed, for the control of the releveling zone through a safety circuit (IZS).
This switch must have an N.O. contact (closed at floor).

ULS, DLS
Top and bottom floor limit switches

USS
Up Stop Switch
(Down Slowing-down)

DSS
Down Stop Switch
(Up Slowing-down)

IZS
Door zone switch

X1 = Up Slowing-down space

X2 = Up Stop space

Y1 = Down Slowing-down space

Y2 = Down Stop space

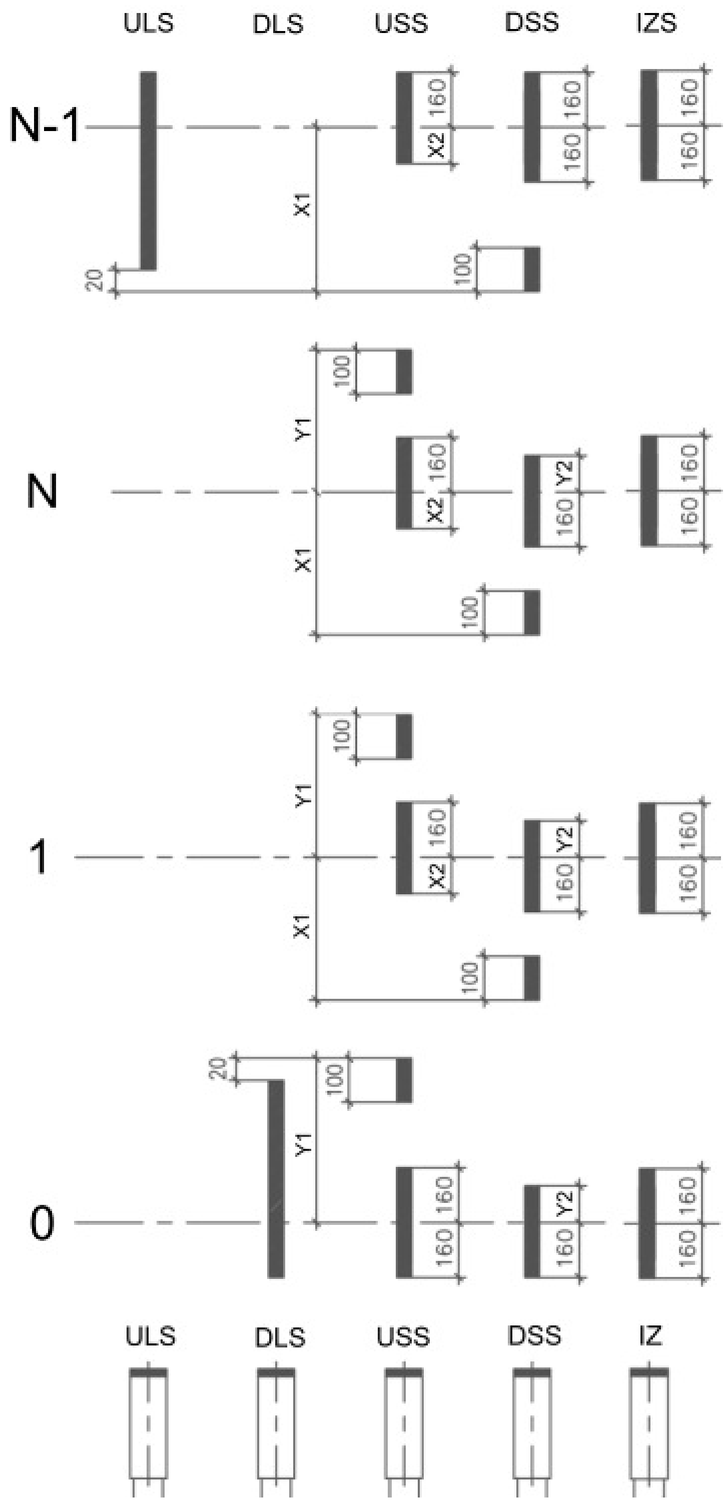


Fig. 20

DECLARATION OF CONFORMITY

Manufacturer: **SMS SISTEMI E MICROSISTEMI s.r.l.**

Address: **Via Guido Rossa, 46/48/50 – Loc. Crespellano 40053 Valsamoggia BO**

Product: **MICROPROCESSOR BOARDS FOR LIFT**

Model / Type: **ELESYS SYSTEM**

The above mentioned products are in conformity to the requirements of the following European Directives:

- **95/16/CE** **LIFTS**
- **2004/108/CE** **ELECTROMAGNETIC COMPATIBILITY**

when installed following the instructions IN THE User's Manual.

To evaluate the conformity, the following STANDARDS have been taken into consideration:

- **UNI EN 81.1: 2010**
- **UNI EN 81.2: 2010**
- **UNI EN 12015: 2014**
- **UNI EN 12016: 2013**

DATA: 07-05-2015

SMS SISTEMI E MICROSISTEMI s.r.l.

Ing. VITTORIO MAZZONI
PRESIDENT

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